FAUNA OF LAKSHADWEEP

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FOREWORD

The Zoological Survey of India, during 75 years of its existence has surveyed every state, union territory and island groups within the political boundary of the country. However, some areas remain little explored or have been explored with reference to specific faunal groups. Lakshadweep archipelago with a group of 36 islands of which ten are inhabited remained one such little explored area. However in recent years, scientists of this survey have carried out extensive investigations on the Meiofauna, results of which are presented in this publication. It is worthwhile to note that a substantial part of faunal elements are recorded for the first time from the region including 64 species as new records from India and eight species as new to science.

I would like to record my deep sense of appreciation to Dr. A. K. Ghosh, Joint Director for coordinating the programme and to Dr. G. C. Rao and other participating scientists for carrying out the investigations in the remote group of islands and documenting the biodiversity for the present and for the posterity.

Mohammad Shamim Jairajpuri
Director
Zoological Survey of India

30th July, 1991
Lakshadweep archipelago consists of 12 atolls, three reefs and five submerged banks with 10 of its 36 Islands (area 32 sq. km) being inhabited. Scientific expeditions in the area as such can never be restricted to small land mass but must cover a lagoon area of 42 sq. kms, territorial waters of 20,000 sq. kms, and the exclusive economic zone of 400,000 sq. kms.

The faunal elements of Lakshadweep Islands have attracted attention of naturalists, one of the earliest being that of J.S. Gardiner (1903-1906) on the fauna and geography of Maldives and Laccadive Archipelago. During last eight decades, several surveys have been undertaken in these waters and on the group of Islands by scientists from Central Marine Fisheries Research Institute (CMFRI), Cochin, National Institute of Oceanography (NIO), Goa and Zoological Survey of India, besides individual researchers. Results of these investigation have been published sporadically (See Rao, G. C., in p. 5-40 of this publication).

Gardiner's (op.cit) edited volumes mostly present data on the fauna of Minicoy Island along with that of Maldive Islands. Of the Higher vertebrates, the account records four species of birds, and six species of herpetofauna, while amongst invertebrates the volumes record some annelids including a new species, two new species of nemertians, 40 species of crustaceans including three species as new to science, 70 species of insects belonging to the orders Heteroptera, Hymenoptera, Orthoptera and Odonata including 6 new species of Hymenoptera, 14 species of Orthoptera & 12 species of Echinoderms; the fauna as such include both terrestrial and aquatic forms.

The central Marine Fisheries Research Institute, through survey and exploration collected a large number of species for its reference collection in the first two decades after its inception and their catalogues (1969) of Sponges, Corals, Polychaetes, Crustacea, Mollusca, and Fish (Bull Cent. Mar. Fish. Res., No. 7,8,9, 1969) contain references to 10 species of Porifera, 56 species of Cnidaria, three species of Polychaeta, 46 species of Crustacea (Decapoda and Stomatopoda), 13 species of Mollusca, 33 species of Echinodermata and 528 species of Fishes, all collected from Lakshadweep region.

Nagabhushanam and Rao (1972) dealt with 900 species of fauna from Minicoy of which at least 698 species of diverse faunal group were added to the account of Gardiner's (1903-1906) from Minicoy Island. Their report on ecological survey provided a more precise projection on the fauna occurring in Mangrove swamp, sandy floor, Coral beds, Shingles and boulders, Seaward reef, Surf zone and surge channels, Landward Caverns and Ledges, Tide-pools, Plankton and Nekton. The animal groups dealt include Porifera, Coelenterata, Bryozoa, Polychaeta, Annelida, Echiuroidea, Sipunculoidca,
Crustacea, Mollusca, Echinodermata, Tunicata, Enteropneusta, Fishes, Reptilia, and three Mammals (Cetacea).

In 1986, CMFRI published a special issue, under its Marine Fisheries Information Service, (Technical and Extension Series No 68), on Lakshadweep. The publication also includes a 12 page bibliography on marine biological and fisheries research in Lakshadweep. The major emphasis being on development potential of fishery resources in the region, the findings on the basis of long term surveys on environmental features of sea, potential and exploited resources like tuna and live bait fishes, status of coral reef, resources and prospect of other marine fisheries, present an up dated and so far most consolidated account of major, economic faunal resources of the area. In the same publication, it has been mentioned that "published in formation on the marine living resources of Lakshadweep, other than tunas and corals are rather scattered and scanty"

The Zoological Survey of India has in the past and more extensively so during last 5 years (1982-87) carried out surveys with concerted effort to present account of faunal resources. In the succeeding chapters, accounts of 152 species of various group of Meiofauna, 69 species of polychaets, 17 species of Siphunculids, 7 species of Echiurids, 13 species of Stomatopods, 79 species of Insects, 168 species of Molluscs and 72 species of Echinoderms have been presented; of these, many are recorded for the first time from Lakshadweep and or as new records from India; (Table 1). The figures in the table (Table 1) below amply illustrate the significant findings of the present survey and indicate the vast potential and need for future exploration to arrive at an authenticated data base.

<table>
<thead>
<tr>
<th>Group</th>
<th>No. of Species</th>
<th>New to Lakshadweep</th>
<th>New to India</th>
<th>New to Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meiofauna</td>
<td>152</td>
<td>72</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>Polychaeta</td>
<td>69</td>
<td>59</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Sipuncula</td>
<td>17</td>
<td>4</td>
<td>2</td>
<td>One ssp</td>
</tr>
<tr>
<td>Echiura</td>
<td>7</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Stomatopoda</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Insecta</td>
<td>79</td>
<td>36</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mollusca</td>
<td>168</td>
<td>60</td>
<td>-13</td>
<td></td>
</tr>
<tr>
<td>Echinodermata</td>
<td>72</td>
<td>16</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

One has to admit that the economy of the Islands is solely dependent on living natural resources viz. Tuna in the seawater and Coconut Palms on the land. The average contribution of fishery resources other than tunas to the total fish production of the Islands has been estimated at 24% and even though there appears to be a great potential for carangids and perches around Minicoy, no special effort is taken for exploration of the resource "(Kumaran & Gopakumar, 1986). Sea weeds (estimated biomass 5000-10,000 tonnes) provide opportunity to harvest at least at 50% level. The prawns and crabs are not fished under any systematic plan; the resource base of mollusca and echinodermata and marine ornamental fishes have hardly been considered under any management plan. Considering the result of recent investigation on bio-medical
properties of marine organisms, one tends to suggest existence of such vital resource base in the area. One of the vital feature of the fauna of the area is the existence of four species of marine turtles viz. Hawksbill (Eretmochelys imbricata), the Olive Radley (Lepidochelys olivacea), the Green Turtle (Chelonia mydas) and the Leather-back Turtle (Dermochelys coriacea) of which the first three have been enlisted as "endangered species" on a global basis in "1986 IUCN Red list of threatened Animals." The resting beaches of these marine Turtles have been identified and provide ideal condition for long-term research and conservation programme. The future developmental projects need to be pre-assessed to avoid impact on the ecology of such endangered species.

The avifauna, for which a list of 44 species is available on the basis of Betts (1983) report, need positive re-investigation as also the aquatic mammals of sea around Lakshadweep. The ecology and faunal resources of Lakshadweep as such positively indicate that the future development projects of the area can be gainfully implemented on the basis of the sustainable utilisation of living natural resources.

ACKNOWLEDGEMENTS

The author is thankful to Director of Fisheries's Lakshadweep administration for various courtesies and making available the colour transparencies, to Dr. G. C. Rao and all the authors of the present volume for untiring efforts to complete and present the work within schedule and to the Director, Zoological Survey of India for kindly providing the working facilities.

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Publisher : Zoological Survey of India, Calcutta
Ariel view of Kavaratti Island

View from Coast

Courtesy: George Verghese
Coral beds

Coral-reef fishes, *Zanclus cornutus* (Linn.)

Courtesy: George Verghese
Coral-reef fishes, *Pterois miles* (Bennett)

Coral-reef fishes, *Gaterin cinctus* (Sch.)

Courtesy: George Verghese
Coral-reef fishes, *Ctenochaetus strigosus* (Bennett)  
Courtesy: George Verghese

Coral-reef fishes, *Naso lituratus* (Sch.)  
Courtesy: George Verghese
LAKSHADWEEP : GENERAL FEATURES

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INTRODUCTION

The formerly known Laccadive, Amindivi and Minicoy groups of islands in the Arabian Sea were named as Lakshadweep in the year 1973 to form one of the smallest Union Territories of India. Until recently, the Lakshadweep remained biologically one of the least explored regions in the Indian Ocean. Like other oceanic atolls in the circumtropical region, these coral islands are also known to support exceptionally rich and varied forms of animal life more in the sea round them than on their land. The pioneering marine biological investigations in Lakshadweep Sea date back to the end of the nineteenth century when the surgeon naturalist A. Alcock explored the area for a few years from 1891 by the research vessel R.I.M.S. Investigator (Alcock, 1894, 1902). The next important investigation dealing with a comprehensive survey of land and marine fauna in this region occurred during the Cambridge University Expedition led by Prof. J. Stanley Gardiner during the years 1899-1900, although their study included only the Minicoy Island at the southernmost part of this archipelago (Gardiner, 1903-06).

Because of the great abundance of food fish in the Lakshadweep Sea playing an important role in the economy of the islands, subsequent investigations in this region were mainly concerned with the study of fish and fisheries by various scientists of the Fisheries Institutes (Anon, 1986). The regional station of the Central Marine Fisheries Research Institute was established at Minicoy in 1958, resulting in the investigation of fish and other groups of marine invertebrates around the island (James et al., 1986). Nagabhushanam and Rao (1972) made an extensive ecological survey of the marine fauna of Minicoy atoll and reported over 900 species of diverse groups of animals inhabiting the various ecological niches. Thus, the living marine resources of Lakshadweep other than Minicoy have not yet been fully explored, studied and documented.

In recent years, the Zoological Survey of India has also made some frequent surveys of these islands and collected material on diverse groups of land and marine animals. Study of the material of some of these invertebrate groups of animals has resulted in the present publication of a special volume of Lakshadweep, supplementing our existing knowledge on the fauna of these islands. The present paper gives an account of the general features of Lakshadweep, viz., location, geomorphology, topography, climate, rainfall, flora, fauna, biogeography, exploitation and conservation of natural resources, etc., which are to form a common introduction for the systematic account of the fauna in this volume.
LOCATION

These islands lie irregularly scattered in the South Arabian Sea about 200-400 km off and stretched along the south-west coast of India. They are situated between latitudes 8° and 13° N and longitudes 71° and 74° E. The Laccadive, Maldives and Chagos Archipelagoes form an interrupted chain of atolls and reefs on a contiguous submarine ridge in the Central Indian Ocean (Fig.1) The Lakshadweep comprise in all 36 islands, islets, reefs and sand banks distributed north to south in the Arabian Sea (Fig.2). Ten of these islands viz., Bitra, Chetlat, Kiltan, Kadmat, Amini, Agatti, Androth, Kavaratti, Kalpeni and Minicoy, are inhabited by man. There are 17 uninhabited islets, viz., Viringili, Cheriyakara, Valiyakara, Pitti, Kulpitti, Bangarum, Tinnakara Parli I, Parli II, Parli III, Cheriyam, Kodithala, Tilakkam I, Tilakkam II, Tilakkam III, Pitti I and Pitti II. The remaining 9 reefs and sand banks include the Valiyappaniyam, Cheriapanniym, Perumulpar, Elikapeniyam, Utturubilla, Gandhi Dweep, Nehru Dweep, Sastri Dweep and Indira Dweep. Minicoy, the southernmost island of the group is separated from the neighbouring Maldives in the south by 8° channel only by about 120 km. The size of the biggest island (Androth) in Lakshadweep is less than 5 sq km, while the smallest one (Bitra) is less than 1 sq km. All these islands have a total land area of 32.0 sq km. The ten inhabited islands have a land area of 28.5 sq km, while the remaining 17 uninhabited islets are only 3.5 sq km. The rest of the 9 reefs and sand banks which are new formations in this region are yet to be surveyed for details. Thus, although the gross land area of this archipelago is quite small, these islands are scattered over a vast stretch in the sea with about 4200 sq km of the lagoon, 20000 sq km of territorial waters and 400000 sq km of Exclusive Economic Zone.

GEOMORPHOLOGY

Although the Lakshadweep have geologically been considered to be quite young, the early history of these tiny coral islands in the Indian Ocean is not clearly understood. These atolls and submerged banks lie on an extensive submarine ridge in the ocean, with a good number of wide gaps on the way. The Laccadive, Maldives and Chagos Archipelagoes form a contiguous and common submarine mountain ridge stretching about 2500 km in the ocean (Fig.1). The alignment of this prominent and elevated platform has been considered to be in continuation of the Aravalli mountain range of Gujrat and Rajasthan on the Indian mainland from late tertiary times (Mukundan, 1979). These atolls rise steeply from great depths ranging from 1500 to 3000 m. A gradual accretion of marine sediments for long periods has possibly led to the growth of these islands in the midst of the ocean. The fringing reefs were rapidly built and strengthened by the growth of stony corals. The pattern of trade winds and monsoons has been considered a major controlling factor of the geomorphology of these coral reefs as is that of tropical cyclones in the control of coral growth and sediment accumulation (Stoddart, 1972). Presently, the various atolls and banks are considered to be under different stages of development as seen from their structure and physical dimensions. Due to this, the land, reef and lagoon are varying considerably in their size. The central parts of these lagoons are encumbered with numerous coral knolls. The sand banks have developed along the reef margins and their growth appears quite poor in the vicinity of the reef opening. The huge amounts of sediments in these lagoons are characterised by gravel and coarse sand, often mixed with coralline powder and silt. The sands are quite white as
Fig. 1. Map showing the location of Laccadive, Maldives and Chagos archipelagoes in the Central Indian Ocean.
Fig. 2. Map showing the disposition of Lakshadweep in the South Arabian Sea

Fig. 3. Topography of land, lagoon and reef on a typical atoll.
they are largely derived from molluscan shells and weathered corals. Hence, they are entirely composed of pure calcium carbonate and very little silica.

**TOPOGRAPHY**

These islands are identical in their topography, completely enclosed within coral reefs and situated generally on the windward reef flat at the eastern side. The atolls and submarged reefs of varied dimensions are similar in their formation and disposition excepting the island of Androth. They are roughly crescent-shaped with their ends disposed north to south, bulged to the east and with the concave portion facing the west. The shallow water lagoons are contained on the west. These islands slope abruptly on the eastern side, resulting in steep shelf close to the shore. Due to this, the shore profile on the leeward side is quite different from that of the windward side of the atoll. The seaward beaches on the eastern side are stormy and subjected to severe wave action. As a result, the beaches are quite steep, narrow and composed mostly of coarser elements as pebbles, rocks and boulders. The leeward beaches on the western side are sheltered and protected from the wave action.

The lagoons on these atolls are magnificent, quite calm and clear. They are saucer-shaped shallow water depressions, varying considerably from 1 sq km to 150 sq km in area and 2 to 15 fathoms in depth. The lagoons are protected from severe wave action of the sea by the crescent-shaped coral reef on the western side and the island proper on the eastern side (Fig.3). Thus, the surrounding reef separates the land and the lagoon from the sea. The surging waves always break on the reef, protecting the land and the lagoon. The reefs are open in their disposition, with surge channels constantly exchanging waters between the surrounding sea and the lagoon. Correlated with the prevailing winds in this region, the surge channels are mostly oriented in the north-west and south-west direction. These channels are gaps on the reefs and are of navigable depth, so that boats can conveniently enter from the lagoon into the sea and back. The lagoons are used by the local people as natural harbours for the safe anchorage of their boats. Ships cannot enter these shallow water lagoons and hence are anchored at a distance in the open sea. Due to these reasons, passengers availing ships have to depend on small boats to travel to and fro from these islands even during the turbulent weather. The lagoon bottoms are mostly covered with sand or coral bed or algal debris. The sheltered lagoon beaches on the western side of the islands are extensive and sandy, with occasional concentrations of sea weed. The southern ends of these islands are generally covered with coral stones, while the northern tips are sandy.

All these islands are flat, with the land only a few metres above sea level. There are no bays, creeks, estuaries, rivers, streams, lakes, tanks, hillocks, forests and deserts. A few brackish water ponds occur only at Bangaram and Minicoy. The thin layer of top soil is formed mostly from fragmentation of coral lime, stones and sedimentary rocks. It is quite porous and retains very little moisture. Due to this, even after a heavy rainfall, no trace of water remains on the islands. Consequently, little vegetation grows on surface soil during wet months but gets dried up soon during hot weather. Freshwater is available in all the ten inhabited islands 1-2 metres below the ground level. The rest of these islands still remain uninhabited due to lack of potable water on them.
IMPORTANT ISLANDS

The ten inhabited islands on Lakshadweep are important because they offer suitable land and limited ground water resources for human settlement. These islands also support a rich variety of fauna in their reefs and lagoons. Three more islands in the archipelago, viz., the Pitti, Bangaram and Suheli Par are also important for their rich faunal resources. Hence, a brief description of these 13 selected islands is given below.

**Bitra** (11°36'N and 72°10'E): It is the north-westernmost and the smallest inhabited island in the archipelago. The land is spindle-shaped and has an area of about 0.1 sq km (Fig.4). Thick shrubs occur around the coast, while the interior is filled with coconut groves. It has an extensive lagoon 6x4 km in size. The island lies at the northern end of its lagoon. Being protected on all the sides, wide coralline sandy beaches occur all around. The sandy beach on the eastern side of the reef gets dried up during low tide.

**Chetlat** (11°41'N and 72°43'E): It is the northernmost inhabited island of the group, having a feeding bottle-shaped land with an area of 1.0 sq km. The lagoon is shallow, 2.0x1.2 km in size, with two entrance channels on the reef (Fig.5). The east banks of the island support wide stretches of coral debris resulting from heavy storms. These debris belts are widest on the south, covering the whole southern end of the island. Soil is poor with very little humus. The island is thickly planted with coconut groves.

**Kiltan** (11°29'N and 73°E): The island is about 3.0 km long and 2.6 sq km in area. Storm beaches occur on the northern and southern ends, as well as on the eastern side. The lagoon is shallow with full of coral rocks, 900 m wide, and runs along the whole length of the island (Fig.6). There are two entrance channels. Annually, accretion of sand occurs on the western beach. The island is relatively fertile and thickly planted with coconuts. Due to excessive heat on this island in summer months, local people prefer to sleep outside on beaches in cubicles made of cadjan leaves.

**Kadmat** (11°13'N and 72°47'E): The island stretches north to south, 8 km long, 0.5 km wide and about 3 sq km in area. It is spindle-shaped, broadest in the middle and tapers to a narrow strip at the southern end. The lagoon on the western side is quite large, narrow on the eastern side and gets fully exposed at low tide along with a 100 m wide reef (Fig.7). The substratum is made up of hard coral stone, famous in the islands. The soil is fertile supporting rich coconut groves.

**Amini** (11°07'N and 72°44'E): The island is oblong and completely fills the interior of the ring reef (Fig.8). Due to the sheltered condition, sandy beaches occur all around the island. It is 3 km long, 1.5 km at its broadest point and 2.6 sq km in area. The island is thickly planted with coconut groves. The lagoon is quite narrow, broadest on the northern side and has four entrance channels. There is a thick formation of coral stone on the eastern and western beaches. The stone is cut and used by the local population for building their houses.

**Agatti** (10°51'N and 72°11'E): It is the most westernly located island of the group and club-shaped, with a broad northern part and the narrow southern strip (Fig.9). The island is 6 km long, 1 km wide at its broadest point and 2.7 sq km in area. As an exception, there are no storm beaches on its eastern side and clean sandy belts occur in
RAO: Lakshadweep: General Features

Fig. 4. Bitra Island

Fig. 5. Chetlat Island
Fig. 6. Kiltan Island

Fig. 7. Kadmat Island
Fig. 8. Amini Island

Fig. 9. Agatti Island and the uninhabited Kalpiti Islet
the intertidal zone. The lagoon is extensive on the western side. Thick coconut groves occur on the northern side, while the southern part supports short shrub jungles ending with spiny grasses on the shore. Separated by a narrow channel in the lagoon on the southern side lies the small uninhabited islet Kalpitti, with rocks all around.

**Androth** (10°49'N and 73°41'E) : This is the easternmost island of the group and nearest to the Indian mainland. Unlike other islands of the archipelago, it is disposed in the east-west direction. The island has practically no lagoon, as it fills the entire ring reef around it (Fig.10). It is the largest island in this group, about 6 km long, 0.7 km in maximum width and 4.8 sq km in area. In the absence of a lagoon, the sandy beaches and reef flat get fully exposed at low tide all around the island except for the north-eastern extremity. The soil is uniformly fertile and the island is thickly planted with coconut trees.

**Kavaratti** (10°33'N and 72°38'E) : It is the capital of the Union Territory and occupies nearly a central geographical position in the archipelago. All the major administrative offices are located on this island. The island is about 6 km in length, 1.3 km in maximum width at the north and tapers down to a narrow strip on the south-west (Fig.11). It has a land area of 3.6 sq km. The island lies within the reef on the eastern side. The lagoon on the western side is shallow and 1.5 km in maximum width. Wide sandy beaches get exposed at low tide on the lagoon side of the island. In addition to the coconut plantations, a major agricultural farm, a boat building yard and a marine aquarium, are located on this island.

**Kalpeni** (10°05'N and 73°39'E) : It lies 76 km south of Androth. The island along with three satellite islets of Cheryam, Tilakkam and Pitti lie enclosed in an extensive lagoon. The island bulges to the south-west and narrows to a point in the north-east (Fig.12). The reef flat connecting Kalpeni with Cheryam gets fully exposed at low tide. Tilakkam and Pitti presently occur as five small islets well separated by narrow channels of the lagoon. They are full of coral rocks and pebbles. The lagoon is wide on the western side, while the island occupies the eastern part of the atoll. Eastern shores of the island support huge storm banks of coral debris. This island is 2.3 km in area.

**Minicoy** (08°17'N and 73°04'E) : It is the southernmost island of the group, located about 120 km from the neighbouring Maldives. The atoll is oval in outline, with its pointed end directed to the north-east. The island proper is located on the eastern side of the reef, crescent-shaped, reaches more than 10 km in length, 0.8 km in maximum width and 4.4 km in area (Fig.13). The lagoon is quite large and about 15 m in maximum depth. Fine sandy beaches occur on lagoon side of the island. The reef has six surge channels of varying size. Southern part of this island supports large tracts of the screw-pine jungles. There is a small rocky islet named Viringili at the northern side of the island, which remains uninhabited even to this day. It is largely used for quarantine purposes and hence called as small-pox islet.

**Pitti** (10°47'N and 72°32'E) : It is a small uninhabited rocky island 1.2 hectares in area and lies 24 km north-west of Kavaratti. The reef is quite small with a tiny sand bank at its southern end, while the rest is covered with steep rocks (Fig.14). Vegetation is completely absent due to the rocky substratum. Gigantic flocks of Indian Sooty Tern and Philippine Noddy Tern migrate to this islet during their breeding season from
Fig. 10. Androth Island

Fig. 11. Kavaratti Island
Fig. 12. Kalpeni Island and its islets

Fig. 13. Minicoy Island and the uninhabited Viringili Islet
January to March. In the absence of any trees, all these eggs birds lay their eggs on land. Due to the collection of huge numbers of these in the past by local inhabitants, to offer protection for their populations, the island has now been declared a bird sanctuary. Rich deposits of guano are available on this island due to the accumulated bird castings for the past several centuries.

**Suheli** (10°05’N and 72°16’E): It is a banian reef located 47 km south-west of Kavaratti. In the huge lagoon lie two uninhabited islets known as Cheriyakara and Valiyakara (Fig.15). The islets are only one metre above sea level. Unlike other islands, these are exclusively of sand banks and lack a hard substratum. Due to this, wide sandy beaches occur around these two islets. Extensive coral heads are exposed in the shallow waters of the lagoon during low tide with a rich variety of fauna associated with them. There are about half a dozen entrance channels on the reef surrounding the lagoon. Both, Cheriyakara and Valiyakara are fertile and support rich coconut groves on them. With a rich variety of fauna in its clear lagoon waters, Suheli Par is well suited for creation of an ideal marine national park in this archipelago.

**Bangaram** (10°56’N and 72°17’E): This is an uninhabited island with an area of 46.5 hectares lying about 8 km north of Agatti. It is situated in an extensive lagoon 10x6 km in size. Two tiny islets, Tinnakara and Parali, lie in the lagoon east of Bangaram. Only paroli touches the reef in the east (Fig.16). All the three islands are surrounded by sand banks. The lagoon is mostly sandy with rich patches of coral beds. All these islands are completely encircled by a reef with a prominent surge channel in the west. Parali being quite rocky is devoid of rich vegetation. Its eastern shore is directly exposed to the sea, resulting in considerable erosion of its beaches and the separation of the island into three bits. A wide stretch of sand bank gets exposed at low tide between Parali and Tinnakara. Bangaram and Tinnakara are fertile, supporting rich growth of shrubs and coconut trees. With the beautiful sandy beaches and the extensive lagoon all around, Bangaram has been declared a tourist centre in these islands. The island has also become a favourite fishing and turtle hunting ground for the local people.

**CLIMATE AND RAINFALL**

These islands have a warm tropical and humid climate all through the year. The atmospheric temperature during the year varies between 17°C and 37°C, with a slight increase from south to north. Though the sun is bright and hot during dry season, the cooler sea all around and the thick coconut groves on land keep the islands considerably cool with pleasant breeze. There is very little seasonal variation in this region except for the two monsoons. March, April and May are the three hottest months of the year. They have a major rainfall from the south-west monsoon from late May to early October, while the weak spell of north-west monsoon prevails from November to January. The rainfall in this area generally decreases from south to north, but during the south-west monsoon it increases from south to north. The annual rainfall on these islands, however, averages to 1600 mm (Mannadiar, 1977). The surface water temperature in the sea is known to vary between 28°C and 31°C, while its salinity ranges from 34 to 37°/000. Due to the ambient oceanic conditions and the prevailing winds in the area, these islands are subject to frequent tropical cyclones and storms, considerably influencing the growth and destruction of their coral reefs. A high tidal range is experienced in this region, the springs ranging from 0.3 m to 2.0 m. Due to this, wide stretches of the intertidal zone get exposed at low tide. The Lakshadweep Sea remains
Fig. 14. Pitti Island

Fig. 15. Suheli Par showing the islet Cheriya Kara and Valiya Kara

Fig. 16. Bangaram Island and its other Islets
rough during monsoon that during the period these islands remain practically cut off from each other and also from the rest of the world for purposes of communication.

THE FLORA

The natural vegetation on these islands is mostly composed of the herbaceous or shrubby bushes and devoid of the elements characteristic of the tropical evergreen rain forests. Due to uniform conditions of climate, composition of soil and topography of the islands, vegetation on these islands is also very similar in its character. Good populations of earthworms occurring in these soils keep maintain their fertility. As the soil is relatively poor with very little humus and highly porous, it does not retain moisture due to rapid drainage of water. Hence, the soil in general is well suited only for the cultivation of deep-rooted plants like coconuts. For this reason, all the islands excepting the rocky islet Pitti, are practically covered with dense coconut groves. The coconuts were planted on these islands by the earliest settlers from Kerala. Although a good number of the deciduous herbs, shrubs and climbers grow with the onset of monsoon, they dry up with the start of hot weather. Mangroves are also practically absent on all these exposed oceanic reefs, as these plants are mainly characteristic of sheltered coastal areas. Bordering the shores of some these islands occur thickets of screw-pine jungles and thorny bushes. The littoral communities comprised mainly of the *Casuarina*, *Pandanus* and *Terminalia* scrubs.

Many plants of economic importance producing fruits, vegetables, tubers, herbs, spices, sugar, rice, arecanut, etc. have been introduced from mainland replacing the original vegetation on these islands. They are being cultivated in all the inhabited islands in agriculture farms maintained by the Administration as well as in private kitchen gardens. However, Androth, Agatti and Minicoy islands have still some original types of bushy vegetation on them. In all about 350 species of vascular plants were recorded on these islands (Raghavan, 1977; Mukundan, 1979). They comprise over 300 species of angiosperms producing seeds, while the rest are made up of some ferns, lichen and moss (See Appendix I).

The shallow water lagoons of these atolls support rich beds of sea grass as *Thalassia hemprichii* and *Cymodocea isoetifolia* adjacent to their beaches. These grasses considerably help prevent erosion of these lagoon beaches resulting from wave action. Hitherto, more than 100 species of marine algae and sea weeds occurring in considerable abundance on diverse habitats were recorded from these atolls belonging to the genera *Gracilaria*, *Gelidiella*, *Gelidium*, *Ulva*, *Gelidiopsis*, *Turbinaria*, *Sargassum*, *Halimeda*, *Dictyota*, *Laurencia*, *Jania*, *Caulerpa*, *Tolypiocladida*, *Chondrococcus*, *Hypnea*, *Acanthophora*, etc. (Krishnamurty and Joshi, 1970; Anon, 1979). Bulk of the marine algal growth, however, occurred on the lagoon floor than on the surrounding reef. *Halimeda gracilis* is the most abundant and widely distributed algal species on these atolls, both on reefs and in lagoons. *Gelidiella acerosa* is next in importance.

THE FAUNA

*Land fauna* :

The richness of fauna in a region is generally dependent on the richness of flora and the diversity of habitats in the area, offering optimum conditions for their food, safety and propagation. But, due to the poor soil, limited land area, meagre variety of natural
vegetation, absence of forests and freshwater habitats, the land fauna associated with the various terrestrial ecosystems as seen elsewhere is largely missing on these islands. With the result, like the native vegetation, the variety of land fauna on these islands is also very poor. The indigenous land invertebrate fauna inhabiting these islands mainly consists of the soil-living protozoans, nematodes and earthworms as well as the terrestrial isopods, crabs, hermit-crabs, insects, mites and spiders. As elsewhere, the insects comprise the largest group of organisms. Mosquitoes are quite common in many of these islands. The beetles, cockroaches, butterflies, grasshoppers, thrips, flies, ants and white-ants are the next abundant groups of insects on this archipelago.

Among the vertebrates, freshwater fishes are absent due to the complete absence of freshwater bodies on these islands. Of the amphibians, only the common frog *Rana tigrina* was recorded from Minicoy. Of late, some toads of the species *Bufo melanostictus* were collected by us on Kavaratti island. They were possibly the ones imported from the Indian mainland by the local college authorities for educational purposes and the unused ones left on the island multiplied. Frogs are not seen on other islands. Due to their susceptibility to saline and brackish water conditions, the amphibians in general are very poorly represented on oceanic islands. Few reptiles were recorded on this archipelago. They comprised the wall-lizards or house-geckos *Hemidactylus frenatus* and *Gekko smithi*, the garden lizards *Calotes versicolor*, *C. liocephalus* and *C. calotes*, the skink *Mabuya carinata*, the worm-snake *Typhlops braminus* and the wolf-snake *Lycodon travancoricus*. No poisonous snakes have hitherto been recorded on these islands.

Among the vertebrates of land, the birds due to their great powers of flight and migration are better represented on this archipelago compared to the other groups of animals. The diverse species of avifauna recorded on these islands include both the permanent residents as well as the regular migrants and some introduced ones (Appendix I). Betts (1938) reported 44 species of birds comprising the plovers, terns, sand-pipers, shear-waters, teals, herons, harriers, etc. The common Indian crow *Corvus splendens* is still uncommon, being sighted only on a few of these islands. The bird island "Pitti" is famous for the gigantic flocks of terns, sea gulls and other oceanic birds, which live on the rocky ground and breed there.

There are no native mammals as such on these islands. The few introduced ones whether intentional or accidental include the common cat *Felis domestica*, the musk shrew *Suncus murinus* and the two house mice *Rattus rutilus rufescens* and *Rattus rutilus alexandrianus*. These two mice increased in such large numbers that they proved serious pests to coconuts. Domestic cattle, particularly the goats and the poultry birds, are common in all the inhabited islands. In the absence of forests and wide grass lands, there is very limited scope even to improve cattle stocks on these islands.

**Marine fauna**:

As elsewhere, these tropical atolls are endowed with a rich heritage of marine animal life characteristic of the beach, lagoon, reef and the sea around. The littoral and subtidal sediments of the lagoon support a rich variety of the smaller meiofauna of diverse groups of free-living invertebrates. The Nematoda, Copepoda, Archiannelida and Polychacta constituted the major groups comprising over 70% of the total numbers
RAO : Lakshadweep : General Features

(Fig.17). The Foraminifera, Ciliata, Turbellaria and Gastrotricha are the next major groups in their importance, while the remaining groups as Hydrozoa, Nemertina, Kinorhyncha, Oligochaeta, ostracoda, Isopoda, Amphipoda, Cumacea, Insect larvae, Halacarida, Tardigrada, Mollusca, Holothuroidea and Tunicata, occurred in much smaller numbers (Rao and Misra, 1983). Macrofauna in these sediments largely consisted of the deposit and the filter feeders which mostly lead a burrowing mode of existence. They include the polychaetes, oligochaetes, ostracods, shrimps, amphipods, crabs, hermit crabs, peanut worms, gastropods, bivalves, sea urchins, sea cucumbers, star fishes and fishes. Among these groups, the polychaetes, decapod crabs, gastropods and bivalves comprised the major constituents of the macrofauna.

The coral reefs on these atolls support the most luxuriant and highly varied populations of colourful marine fauna as sponges, flatworms, sessile hydrozoans, sea anemones, sea fans, stony corals, fleshy corals, nemertines, polychaetes, barnacles, isopods, amphipods, stomatopods, crabs, hermit-crabs, prawns, alphtids, shrimps, lobsters, peanut-worms, echiurids, bryozoans, brachipods, gastropods, bivalves, chitons, cephalopods, starfishes, brittle stars, sea urchins, sea cucumbers, sea squirts, fishes, sea snakes and sea turtles. With all the rich assemblage of these animals, the atolls have appropriately been called a coral paradise of marine life. Qualitatively and quantitatively, the anthozoan corals, worms, crustaceans, molluscs, echinoderms and fishes comprised the major groups of marine macrofauna on these atolls (Fig.18). Hitherto, more than 80 species of corals under 30 genera have been recorded on these atolls, with the possibility of discovering more species in future investigations in this area (Gardiner, 1903-06; Nagabhushanam and Rao, 1972; Pillai, 1986). The genus Acropora with the richest number of species in the Indian Ocean is well represented on these islands, but the absence of the two widespread foliaceous forms, Montipora foliosa and Echinopora lamellosa is a notable feature for this region (Pillai, loc. cit.). The stony corals offer an excellent habitat to a myriad of these organisms. Big shells of the giant calm Tridacna and the cephalopod Octopus are quite common on these reefs (Burton, 1940). However, the most spectacular and colourful animals inhabiting these coral reefs are the beautiful fishes which are well adapted with their compressed bodies to use this cavernuous habitat for purposes of food, concealment and protection from potential predators. Due to these reasons, it is not surprising to note that a rich variety of sea birds hover about these atolls for their food comprising the varied groups of animals inhabiting the coral reefs.

Greatly influenced by the Lakshadweep-Maldive and Chagos submarine ridge, the prevailing currents and water movements in Lakshadweep Sea are largely responsible for a high productivity of phytoplankton and zooplankton. Due to these reasons, the open waters in the lagoons and the sea around support a rich variety of the zooplankton, nekton and benthos. The faunal constituents of plankton in this region are represented by all the groups characteristic of this niche. They consisted of the pelagic foraminifers, siphonophores, scyphozoan medusae, ctenophores, polychaetes, ostracods, copepods, amphipods, mysids, euphausiids, chaetognaths, pteropods, tunicates, fish eggs and the larvae of polychaetes, crustaceans, molluscs, echinoderms, other benthic invertebrates and fishes. As usual, the Copepoda generally formed a dominant element of the zooplankton community in this region.
Fig. 17. Relative abundance of the diverse groups of meiofauna in littoral sediments on Lakshadweep.

Fig. 18. Relative abundance of the diverse groups of macrofauna associated with the coral reefs on Lakshadweep.
The nekton consists mainly of the prawns, squids, fishes, sea snakes and sea turtles. As everywhere, fishes are the largest constituent of nekton in the Lakshadweep Sea. The lagoon beds are mostly covered with coral rocks of veriegated hues and shapes amidst which swim a rich variety of multi-coloured fishes. A great diversity of live-bait fishes which proved quite useful in augmenting the tuna fish catches in this region inhabit the lagoon waters on these atolls. All the four important species of sea turtles, the green turtle *Chelonia mydas*, the hawksbill *Eretmochelys imbricata*, the olive-ridley *Lepidochelys olivacea* and the leather-back *Dermochelys coriacea* have also been reported from these atolls (Bhaskar, 1984). In addition, the larger sharks, rays, dolphins, porpoises and whales occur in the open sea.

The meioobentos examined in the bottom sediments of the lagoon floor showed a reduced faunal diversity and preponderance of individuals. They largely consisted of the nematodes, foraminifers, polychaetes, copepods and molluscan larvae, while the turbellarians, gastrotrichs, archiannelids, oligochaetes, ostrocods and amphipods were poorly represented. Macrobenthos on the lagoon sediments and coral rocks comprised the sponges, hydrozoans, anthozoans, polychaetes, sipunculans, nemertines, mysids, isopods, amphipods, stomatopods, prawns, crabs, hermit crabs, lobsters, gastropods, bivalves, starfishes, brittlestars, sea urchins, sea cucumbers, sea squirts and fishes. Thickets of corals in these lagoons also formed the habitat for a rich variety of reef fishes and the live-baits.

Thus, these islands with a vast area of Exclusive Economic Zone in the Lakshadweep Sea, sustain a rich variety of fishery potential. Hitherto, more than 700 species of marine fishes were reported from diverse ecological habitats in this region, with the possibility of discovering more number of species in future investigations (Nagabhushanam and Rao, 1972; Jones and Kumaran, 1980; Venkateswarlu and Ilango, 1982). The important pelagic food fishes in this region include the tuna, sharks, rays, perchs, carangids, half-beaks, seer-fish and a few other miscellaneous varieties. Among them, the tuna always formed a dominant element of this resource, comprising three-fourths of the total catch. Of the tuna, the skipjack *Katsuwonus pelamis* contributed the bulk, forming 80-90% of the total catch. The yellow fin tuna *Thunnus albacares* stands next in the overall abundance.

The rich potential of live-bait fishes occurring in these waters is also playing an important role in sustaining a flourishing tuna fishery industry in this area. Although about 50 species of live-baits are known to occur on these atolls, only about a dozen species are being widely used by the local fishermen for tuna catching. The live-baits are, *Spratelloides delicatulus*, *S. japonicus*, *Archamia lineolatus*, *A. fucata*, *Caesio chrysozona*, *C. caeruleaureus*, *Chromis caeruleus*, *C. ternatensis*, *Gymnoecaesio argenteus*, *Lepidozygus tapeinosoma*, *Apogon sangiensis*, *Pomacentrus pavo*, *Dascyllus aruanus* and *Dussumieria hasselti* (Pillai et al, 1986). Presently live-baits are being collected mostly from lagoons.

**BIOGEOGRAPHY**

Although the Lakshadweep still remains as one of the regions underexplored in the Indian Ocean, we now have a fairly good knowledge of the major faunal components of these atolls as well as their qualitative character. Despite their isolation from each other,
due to uniform conditions of climate and topography; the land flora and fauna on all these islands are also quite similar in their composition. According to Prain (1893), there are no endemic plants on Lakshadweep, the vast majority of them being the same occurring on adjacent Maldives and other oceanic atolls of the Indo-Pacific region. The limited terrestrial fauna showed that a majority of the species of the diverse groups are exotic, with very little or no endemism. This applies equally well to all the invertebrate groups of animals as earthworms and insects as well as to the vertebrates, viz., amphibians, reptiles, birds and mammals. Further, due to geographical proximity, the land fauna in general showed a great similarity with that of the adjacent parts as South India, Ceylon and Maldives. It is, therefore, quite possible that bulk of the land flora and fauna on these islands must have been introduced by man in the recent periods. Alternatively, some of these species must have already been present there before the separation of these islands from adjacent parts following geological changes. But based on the available information, the second possibility is to be regarded as quite remote.

The marine fauna of Lakshadweep comprising the meiofauna and macrofauna in the various ecological niches are mostly eurytopic, the majority of the species having a wide geographical distribution in the tropical Indo-Pacific region (Gardiner 1903-06, Wells 1957, Nagabhushanam and Rao 1972, Jones and Kumaran 1980, Rao and Misra 1983, Pillai 1986). This applies to all the major groups of meiofauna as Nematoda, Copepoda, Annelida and Gastrotricha as well as the macrofauna as sponges, corals, polychaetes, crustaceans, molluscs, sipunculids, echinoderms, tunicates, fishes and reptiles. The sea grasses, weeds and algae occurring in this region are also well known from other areas of the India Ocean (Anon, 1979). None of the genera hitherto recorded on these islands is endemic, all being widely distributed in the tropical and temperate regions. Only a few species of the marine meiofauna and macrofauna in Lakshadweep were discovered as new to science, with very little morphological variation compared with the known species. Thus, the composition and abundance of the marine genera and species of Lakshadweep are very similar in their character compared with those known from other parts of the Indian Ocean. The marine flora and fauna on these atolls are, however, subjected to considerable variation in their composition, density and distribution due to frequent cyclones and storms occurring in this region.

As the Indian Ocean constituted an important biological link between the Atlantic and Pacific Oceans, our increasing knowledge in recent years of the fauna of different islands and continents in this region has contributed considerably to understand the mechanism of their geographical distribution. A zoogeographical comparison of the fauna of a region is to be largely based on the character of its endemic element. Due to their isolation and an extensive barrier of sea, the land fauna of the oceanic islands are generally expected to have a restricted distribution with a high percentage of endemic elements. On the other hand, marine organisms with pelagic larval stages inhabiting their shores are mostly eurytopic with a wide range geographical distribution due to their greater chances of dispersal in the sea without a physical barrier in their way. Thus, geographical isolation of Lakshadweep is expected to result in the evolution of a good number of new and endemic species or subspecies of plants and animals at least on land. Sufficiently large areas of land with varied ecological habitats are normally required to act as viable entities on the long run for biological diversity and the evolution of new species of flora and fauna. But, because of the small area of these tiny land masses and their comparatively recent origin in the midst of the ocean, Lakshadweep is possibly not
supporting a rich variety of the indigenous land flora and fauna seen on other areas of this earth. This is clearly reflected in the absence of any significant amount of endemism in their land flora and fauna. Recent studies have clearly shown that these islands in fact do not have a distinct biogeographical identity with characteristic fauna of their own as claimed in certain quarters. Thus, the Lakshadweep flora and fauna appear to have only a very limited characteristics of their own, the vast majority of the indigenous species occurring both on land as well as in the sea being those which are widely distributed in other oceanic atolls of the Indo-Pacific region.

**EXPLOITATION AND CONSERVATION**

The natural resources of Lakshadweep at the present comprise their scenic beauty, coralline stones and sands, fauna and flora. Fringed with the white coralline sandy beaches, dense groves of green coconut palms and emerald green waters of the magnificent lagoons bordered with deep blue waters of the sea, these enchanting islands present scenes of unique beauty thereby earning them the popular name, "The coral paradise or the Hawaii of the Arabian Sea". The lagoon waters are amazingly calm and clear in the midst of the turbulant ocean, showing the deep bottom corals and associated fauna, particularly the colourful fishes. Bangaram, the beautiful island encircled with coralline sandy beaches and a magnificent lagoon, has already been declared a tourist resort in the archipelago. The island is now attracting a good number of foreign tourists. The gigantic flocks of terns, sea gulls and other marine birds on Pitti island are the other major attraction for the tourists in general and bird-watchers in particular. A helicopter service for inter-island transport has recently been introduced in Lakshadweep and an airport came into existence at Agatti Island for regular flights from Cochin on the Indian mainland. These increased facilities of transport are bound to increase the tourist traffic in the islands in the years to come, both from India and abroad.

Many of these islands are presently yielding valuable stones of coral rocks for construction of buildings. Kadmat is particularly reputed for the yield of best stones in the archipelago. These atolls are also known to support 2000 million tonnes of calcareous sands and boulders worth over Rs. 5000 crores. The sands could profitably be utilised for various industries in the manufacture of cement, iron, steel, calcium carbide, bleaching powder, costic soda, sugar, glass, paper, etc. (Anon, 1985). In the absence of forests and adequate cultivable land, the entire economy of the islands from the very beginning is based on the coconuts from land and fish from the sea around. For this reason, more than 6000 acres of land in these islands is presently kept under coconut cultivation. The skipjack tuna forms the most important commercial food fish in this sea, while the long-line extends the catch to a variety of other pelagic fishes. A rich diversity of edible and commercially exploitable crustaceans as crabs, prawns and lobsters, molluscs, echinoderms and sea turtles occur on these atolls. Trade in a variety of cowries existed in these islands since a long time. Diverse ornamental marine animals as sea fans, sea anemones, corals, crustaceans, molluscs, echinoderms and fishes occurring on these coral reefs could be utilised for limited export and exploitation. The rich potential of sea weeds and algae could be used for the manufacture of a variety of medicines and perfumes.

As everywhere, with the increasing human activities in these islands in recent years, over-exploitation, disturbances of natural habitats and pollution of lagoon waters, have
put increasing pressure on the natural resources and considerably altered their original status. The tropical cyclones and storms, the coral eating star-fish *Acanthaster planci* and the coral boring sponges and bivalves, are the natural forces that cause considerable mechanical damage to these coral reefs. A large number of corals are also being indiscriminately removed by man from these reefs and lagoons for different purposes. In addition to this, a mass mortality of corals is occurring due to excessive siltation resulting from blasting and dredging operations on reef and lagoon, respectively for purposes of navigation. As a result, corals at several places are now looking dead along with the total destruction of their associated fauna. The giant clam, *Tridacna maxima* once found in abundance in these coral reefs and lagoons is much depleted due to the adverse effects of siltation and their overexploitation for their delicious meat and valuable shell. For the same reasons, a serious shortage is also now being experienced for the live-bait fishes very much used in the tuna fishing. The lagoon waters are getting increasingly polluted with the dumping of waste materials on their beaches and the continuous discharge of waste oils, noxious materials, etc. from motor boats. Due to these reasons, the meiofauna species which are quite sensitive to ecological stress are getting rapidly lost. Quarrying of stones, construction of concrete buildings, digging of pits, cutting of natural vegetation, excessive application of pesticides on agricultural crops and the introduction of exotic plants and animals, have further deteriorated the natural ecosystem on these islands (Pillai 1986).

The Lakshadweep with their extensive sandy beaches offer ideal conditions for all the 4 species of sea turtles for laying their eggs. Due to these reasons, the reefs and lagoons on these atolls were supporting earlier large number of these animals. But, with the increasing human activities, excessive collection of eggs and the killing of adults for flesh, fat, oil, shell etc., have caused a great damage to the sea turtle resource on this archipelago. The turtle fat is also widely used by the local fishermen for water proofing of their wooden boats. Due to these reasons, the turtles have abandoned many of their traditional nesting grounds on these islands. Although the sea turtles are protected by law under the Indian Wildlife (Protection) Act 1972, all the 4 species have rapidly declined in recent years. They are now rare and endangered on these atolls. In the circumstances, adequate protection shall be given to these turtles and their nesting sites for their rehabilitation and repletion. The collection of turtle eggs, hatching and releasing the young ones into their natural habitats should be encouraged on these islands. The wildlife act shall be strictly enforced with adequate field staff. Awareness of the public, particularly the fishermen who come into contact with these animals in day to day life, is very necessary for their conservation.

Considering the fast depletion of marine living resources on Lakshadweep, it is quite essential to conserve some of the uninhabited and undisturbed atolls as national parks and wildlife sanctuaries for the fauna to flourish at least in these protected areas without human interference. At present, only Pitti Island has been declared a bird sanctuary on this archipelago. As Bangaram Island has already been declared a tourist centre on these islands, Suheli Par probably remains the only potential area left for conservation of marine fauna. In this connection, the extensive Suheli lagoon with its clean water and the rich variety of ecological habitats offers ideal conditions to become an excellent Marine National Park in Lakshadweep.

Since the land area is limited, any future development in these islands can be undertaken only in the marine environment. Although some of the natural resources on
these islands are renewable, they are not certainly unlimited. As such, they are to be properly managed and judiciously exploited. The quantity of these resources which could be utilised for domestic, industrial and commercial purposes should be carefully determined without causing adverse effects on the regeneration of living resources, natural environment, ecology and safety of these islands. If the disturbing human activities on these atolls continue unabated at the present rate, the rich heritage of their natural resources are likely to be lost to us in no time. Much of our modern development is associated with the destruction of natural environment. Effective conservation measures are therefore necessary to protect the deteriorating environment along with its living and non-living resources. In this connection, the protection of coral reefs on these atolls is most important of all, as the very existence of these islands is dependent on these reefs. Hence, the conservation of marine ecosystem and its natural resources should assume paramount importance in any future plans for the development of these islands (James et al 1986). Presently, the Lakshadweep has a population of about 45000 people at the rate of 1500 persons per sq km of the land area. With the meagre land resources of their own to sustain human life, the carrying capacity of these islands can probably be increased only at the cost of the natural environment and its living resources.

SUMMARY

The paper gives an account of the general features of Lakshadweep as location, geomorphology, topography, climate, flora, fauna, zoogeography and the exploitation and conservation of their natural resources. These tiny coral islands and sand banks numbering 36 lie scattered in the South Arabian Sea along the south-west coast of India. The Laccadive, Maldive and Chagos archipelagoes form an interrupted chain of atolls and reefs on a contiguous submarine ridge in the Indian Ocean. All these islands are identical in their formation, topography and completely encircled by coral reefs. Their saucer-shaped lagoons are magnificent with calm and clear water. The islands have a warm and humid climate, with an average rainfall of 1600 mm. Due to uniform conditions of the climate and topography, there is no remarkable variation in the quality of flora and fauna from island to island. The soil is relatively poor with little humus, porous and well suited for deep-rooted plants like coconuts. The land fauna is quite poor in the absence of forests and varied ecological habitats. A dense and diverse assemblage of marine fauna occurs in these islands on their coral reefs. The zoogeography of land and marine fauna shows that they are largely represented by exotic elements. The composition and abundance of the coral reef communities are quite similar to those reported from other parts of Indian Ocean. The entire economy of these islands is presently based on the coconuts on land and fish from sea. With the increasing human activities on these islands in recent years, the natural ecosystems are being considerably disturbed and animals killed, posing problems for their conservation. Hence, any future plans for development of these islands shall be judicious, with minimum destruction to their natural environment and its living resources.

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*Not referred in original*

**APPENDIX I**

**ALPHABETICAL LIST OF LAND PLANTS AND MARINE ALGAE RECORDED FROM LAKSHADWEEP**

**LAND PLANTS**

*Abelmoschus esculentus* (Linn.) Moench, Lady’s finger; *Abutilon indicum* G. Don, Country mallow; *Acacia concinna* DC, Shikakai tree; *Acacia senegal* Willd, Gum tree; *Acalypha indica* Linn., Indian acalypha; *Achyranthes aspera* Linn., Indian acalypha; *Achyranthes aspera* Linn., Prickly chaff flower; *Achras zapota* Linn., Sapota tree; *Adansonia digilala* Linn., Money bread tree; *Aegle marmelos* Corr., Bael tree; *Aerva lanata* Juss., Medicinal herb; *Aeschynomene indica* Linn., Dodder plant; *Ageratum conyzoides* Linn., Goat weed; *Allium cepa* Linn., Onion; *Allizia lebbek* Benth., East Indian walnut; *Alsonia scholaris* R. Br., Dita Bark; *Alysicarpus monilifer* DC, Dodder Plant; *Amaranthus blitum obracea* Duthie, Pot herb; *Ammannia baccifera* Linn., Blistering ammania; *Anacardium occidentale* Linn., Cashew nut plant; *Ananas comosus* (Linn.) Merrill, Pineapple; *Annona muricata* Linn., Soursop plant; *Annona squamosa* Linn., Custard apple; *Apium graveolens* Linn., Grass Plant; *Areca catechu* Linn., Areca nut tree; *Argemone mexicana* Linn., Prickly poppy; *Aristida plumosa* Linn., Dodder plant; *Artemisia absinthium* Linn. Wormwood plant; *Artemisia maritima* Linn. Wormseed plant; *Artocarpus altiUs* (park) Fosberg, Bread fruit tree; *Artocarpus heterophyllus* Lam., Jack tree; *Asparagus racemosus* Willd., Asparagus plant; *Azadirachta indica* Juss., Neem tree; *Benincasa hispida* (Thunb.) Cogn., Ash gourd; *Blumea membranacea* DC, Medicinal herb; *Boerhavia diffusa* Linn., Spreading hog-weed; *Bombax ceiba* Linn., Silk
cotton tree; **Bougainvillea spectabilis** Willd., Common climbing shrub; **Brassica oleracea** Linn., Cabbage plant; **Caesalpinia crista** Linn., Bonduc nut; **Caesalpinia sepiaria** Roxb., Herb plant; **Caladium acre** R. Br., Herbal Plant; **Calophyllum inophyllum** Linn., Alexandrian laurel; **Calotropis gigantea** (Linn.) R. Br., Milk weed; **Capparis heyneana** Wall., Medicinal plant; **Capsicum annum** Linn., Chilli plant; **Cardiospermum halicacabum** Linn., Baloon vine; **Carica papaya** Linn., Papaya tree; **Cassia fistula** Linn., Papaya tree; **Cassia fistula** Linn., Purgin plant; **Cassia occidentalis** Linn., Negro coffee plant; **Cassia tora** Linn., Medicinal plant; **Casuarina equisetifolia** Linn., Beefwood tree; **Catharanthus roseus** G. Don, Rosy plant; **Cayratia carnosa** (Wall.) Gagnep., Fox grape plant; **Cerbera manghas** Linn., Dog-bane plant; **Chloroxylon swietenia** DC, East Indian satin wood; **Chrysanthemum indicum** Linn., Flower-head plant; **Cissus quadrangularis** Linn., Edible stemmed vine; **Citrus aurantifolia** (Christ.) Swingle, Lemon tree; **Citrus aurantium** Linn., Sour orange; **Citrus limon** (Linn.) Burm., Lemon tree; **Citrus medica** Linn., Citron plant; **Claussena indica** Oliver, Aromatic plant; **Clerodendrum inerme** (Linn.) Gaertn.; **Cocos nucifera** Linn., Coconut plant; **Codium variegatum** Blume, Croton plant; **Colocasia esculenta** (Linn.) Schott., Cocomy plant; **Corchorus aetuans** Linn., Medicinal plant; **Coriandrum sativum** Linn., Medicinal shrub; **Cryptolepis buchanani** Roem.-& Schult., Fibre plant; **Cryptolepis elegans** Wall., Fibre plant; **Cucumis melo** Linn., Sweet melon; **Cucumis sativus** Linn., Cucumber; **Cucurbita maxima** Duch., Red gourd; **Cucurbita minima** Linn., Small cucumber creeper; **Cucurbita pepo** Linn., Pumpkin; **Cyanotis cristata** Schult., Fodder plant; **Cyperus arenarius** Retz., Grass plant; **Cyperus crenatus** Roez. & Schult., Fodder grass; **Cyperus cyperoides** (Linn.) Kunth, Grass plant; **Cyperus elusinoides** Kunth., Fodder plant; **Cyperus kallingia** Endl., Medicinal plant; **Cyperus pennisetum** Lam., Sand creeper; **Cytococcus trigonum** A. Camus, Fodder grass; **Dactyloctenium aegyptium** Beauv., Grass plant; **Datura stramonium** Linn., Stink weed; **Debregeasia ceylanica** Hook, Fibrous plant; **Delonix regia** Rafin, Flamboyant flame tree; **Dendrocalamus strictus** Neer, Solid bamboo tree; **Desmodium triflorum** DC, Fodder grass; **Digitaria decumbens** (HB & K), Henr., Fodder plant; **Digitaria bicorns** (Lam.) Roem. & Schult., Fodder grass; **Digitaria longiflora** (Retz.) Pers, Fodder plant; **Dioscorea oppositifolia** Linn., Edible tuber; **Dolichos lablab** Linn., Indian butter bean; **Dregea volubilis** (Linn.) Benth., Food plant; **Eclipta prostrata** Linn., Medicinal herb; **Ephedra foliata** Boiss. & Kots., Medicinal plant; **Eragrostis ciliaris** (Retz.) Pers, Fodder plant; **Eragrostis tenella** Roem. & Schult., Fodder grass; **Erythrina variegata** Linn., Indian coral tree; **Euphorbia nivulia** Buch.-Ham., Medicinal plant; **Ficus bengalensis** Linn., Banyan tree; **Ficus glomerata** Roxb., Athi tree; **Ficus indica** Linn., Medicinal tree; **Ficus religiosa** Linn., Peepal tree; **Fimbristylis serruinea** Vahl., Mat plant; **Fimbristylis spathacea** Roth., Weedy Plant; **Gloryosia superba** Linn., Malabar glory lily; **Glycomis pentaphylla** (Retz.) Correa., Medicinal plant; **Glycerrhiza macroloba** Lam., Medicinal plant; **Gossypium arboreum** Linn., Cotton plant; **Grewia tenax** (Forsk.) Aschers. & Schuw, Fodder Plant; **Helianthus annus** Linn., Common sunflower; **Hemidesmus indicus** R. Br., Indian sarsaparilla; **Heteropogon contortus** (Linn.) Beauv., Spear grass; **Hibiscus cannabinus** Linn., Deccan hemp plant; **Hibiscus mutabilis** Linn., Cotton-rose plant; **Hibiscus rosasinensis** Linn., Shoe-flower plant; **Hibiscus tiliaceus** Linn., Coast cotton tree; **Holarrhena antidysenterica** (Linn.) Wall., Medicinal plant; **Ichneocarpus frutescens** R. Br., Medicinal herb; **Impatiens balsamina** Linn., Garden balsam; **Indigofera cordifolia** Heyne, Fodder plant; **Indigofera purpurea** Roxb., Wild indigo plant; **Indigofera tinctoria** Indian indigo plant; **Ipomoea aquatica** Forsk., Swamp
cabbage; Ipomoea batatas (Linn.) Lam., Sweet potato; Ipomoea biloba Forsk., Goat-foot creeper; Ipomoea cairica (Linn.) Sweet., Railway creeper; Ipomoea quamoclit Linn., Indian pink vine; Ipomoea repens Rath., Medicinal plant; Ischaemum aristatum Linn., Fodder plant; lXora coccinea Linn., Jungle flame plant; Jasminum officinale grandiflorum Linn., Common jasmine creeper; Juncellus inundatus Clarke, Tuber plant; Kyllinga brevifolia Rottb., Medicinal herb; Lagenaria siceraria (Mol.) Standl., Bottle gourd creeper; Lantana camara aculeata Mold., Wild sage plant; Leucas aspera Spreng, Honey-sucker plant; Luffa acutangula (Linn.) Roxb., Ribbed gourd; Luffa cylindrica (Linn.) Roem, Sponge gourd; Lycopersicon esculentum Mill., Tomato plant; Mangifera indica Linn., Mango tree; Macaranga roxburghii Wight; Manihot esculenta Crantz., Tapioca plant; Marsdenia tenacissima Wight & Arn., Fibre plant; Melia composita Willd., Malabar nim wood; Modecea palmata Lam., Medicinal herb; Momordica charantia Linn., Bitter gourd; Morinda citrifolia Linn., Dye plant; Morinda corea Buch.-Ham., Medicinal plant; Moringa oleifera Linn., Drum stick tree; Mucuna monosperma DC, Medicinal plant; Murraya koenigii (Linn.) Spreng, Curry leaf tree; Musa paradisiaca Linn., Banana or plantain; Myristica fragrans Houtt., Nutmeg tree; Nels6nia canescens (Lam.) Spreng, Fodder plant; Nerium indicum Mill., Indian oleander; Nerium oleander Linn., Oleander plant; Ocimum sanctum Linn., Holy basil plant; Oryza sativa Linn., Paddy plant; Paneratium zeylanicum Linn., Medicinal plant; Pandanus andamanensis Kurz., Pandanus plant; Pandanus odoratissimus Linn., Screw-pine; Paspalum vaginatum Sw., Sand-binder; Passiflora goettda Linn. Sünkng passion flower; Passiflora suberosa Linn., Medicinal plant; Pavetta indica Linn., White pavaetta plant; Pemphis aculeata Forst., Anchor tree; Pemphis stierongu Forst., Medicinal herb; Physalis minima Linn., Cherry plant; Physalis peruviana Linn., Cape gooseberry; Piper betle Linn., Betel leaf creeper; Piper schmidtii Hook., Nilgiri peeper; Pithecellobium angustifolia Roxb., Hedge plant; Pithecellobium dulce Benth., Madras thorn; Phyla nodiflora (Linn.) Greene, Medicinal plant; Phyllanthus maderaspatensis Linn., Black berry; Pleurostyla opposita Alston, Comb tree; Plumbago zeylanica Linn., Medicinal herb; Polyalthia longifolia thw., Mast tree; Polygala erioptera DC, Medicinal herb; Polygonum barbatum Linn., Spicy plant; Polycarpaea spicata W & A., Medicinal plant; Psidium guajava Linn., Common guava; Quisqualis indica Linn., Rangoon Creeper; Ricinus Communs Linn., Castor Plant; Rosa Alba Linn., White cottage rose; Runga pectinata (Linn.) Nees, Medicinal plant; Ruta graveolens Linn., Garden rue; Saxcharum officinarum Linn., Sugarcane; Saraca asoca (Roxb.) De Wilde, Ashoka tree; Scaevola frutescens Krause, Medicinal shrub; Sesbania cannabina (Retz.) Pers, Prickly sesban; Solanum melongena Linn., Brinjal plant; Solanum nigrum Linn., Black; Spinifex littoreus Merrill, Water-pink plant; Stachyurphea utriculaefolia Sims, Medicinal herb; Streblus asper Lour., Siamese rough-bush; Strobilanthes auriculatus Nees, Medicinal herb; Tamarindus indica Linn., Tamarind tree; Taraxacum officinale Weber, Common dandelion; TecomeUa undulata (Sm.) Seem, Rohida tree; Terminalia catappa Linn., Indian almond tree; Thespesia maculata Corr., Medicinal tree; Thespesia populnea Soland., False rosewood tree; Thevetia peruviana (Pers.) Merrill, Yellow oleander; Tournefortia argentea Linn., Medicinal plant; Tournefortia montana Lour., Medicinal herb; Trichosanthes anguina Linn., Snake gourd; Trichosanthes cucumerina Linn., Cucumber creeper; Tridax procumbens Linn. Coat-button plant; Tylophora indica (Burm.) Merrill, Emetic swallow-wort; Tylophora cornosa Wall., Medicinal Shrub; Tylophora hirsuta Wight, Medicinal shrub; Utricularia stellaris Linn., Medicinal herb; Vetiveria zizanoides (Linn.) Nash., Khas-khas plant; Vinca rosea Linn., Periwinkle plant; Vitex negundo Linn., Medicinal herb; Wagatea spicata Dalz., Medicinal plant;
Zanthoxylum limonella (Den.) Alston, Medicinal plant; Zea mays Linn. Maize; Zingiber officinale Rose Ginger; Ziziphus jujuba Mill., Jujube or ber plant; Ziziphus mauritiana Lam., Indian or common jujube; Ziziphus xylopyra Willd., Fodder plant; Zorina diphylla Pers., Fodder plant.

MARINE ALGAE

Acanthophora delilei Lamour; Acanthophora muscoides (Linn.) Boergs; Acanthophora specifera (Vahl.) Boergs; Amphiroa anastromosans Bosse; Amphiroa fragillissima (Linn.) Lamour; Boergesenia forbesii Herv. Feldm; Botryocladia skottsbergii (Boergs.); Bryopsis corymbosa J. Ag.; Caulerpa clavifera (Turn) Ag.; Caulerpa cupressoides (Vahl.) Ag.; Caulerpa peltata Lamour; Caulerpa taxifolia (Vahl.) Ag.; Centroceras clavulatum (Ag.) Mont.; Ceramium moryae Bosse; Chaetomorpha littorea Harv.; Chaetoinorpha torta (Farlow) Mc Clath; Champia parvula (Ag.) Harvey; Cheilosporum spectabile Harvey; Chondria armata (Kuetz.) Okamura; Chondrococcus hornemannii (Mert.) Schmits; Cladophora sp.; Cladophora fascicularis (Martens) Keutz.; Cladophoropsis zellingeri (Kuetz.) Boergs.; Codium tomentosum Boergs.; Colpomenia sinuosa Derb. & Sol.; Dictyopteris delicatula Lamour; Dictyosphaeria sp.; Dictyosphaeria cavernosa (Forsk.) Boergs.; Dictyotera bartayresiana Lamour; Dictyotera dichotoma (Huds.) Lamour; Dictyurus purpurescens Bory; Ectocarpus arabicus Fig. & De Nat.; Ectocarpus simpliciusculus Agardh; Enantiocladia prolifera (Griv.) Falkenb.; Enteromorpha intestinalis (Linn.) Link; Enteromorpha tubulosa Kuetz.; Galaxaura rugosa Lamour; Gelidiella acerosa (Forsk.P Feldman & Hamel; Gelidiopsis repens (Kuetz.) Schmitz; Gelidiopsis variabilis (Grev.) Schmitz; Gelidium rigidum J. Ag.; Gonioolithon laccadivicum Foslie; Gracilaria arnata J. Ag.; Gracilaria corticata J. Ag.; Gracilaria crassa Harv.; Gracilaria edulis (Gmel.) Silva; Gracilaria folifera (Forsk.) Boergs.; Gymnogongrus pygmaeus (Frev.) J. Ag.; Halimeda sp.; Halimeda gracilis Harv.; Halimeda macroloba Decaisne; Halimeda opuntia Lamour; Halimeda tuna (Ell. & Sol.) Lamour; Halymenia formosa Harv.; Hydroclathrus clathratus (C. Ag.); Hypnea esperi Bory.; Hypnea musciformis (Wulf.) Lamour; Hypnea pannosa J. Ag.; Hypnea valentiae (Turn.) Mont.; Jania adhaerens Lamour; Jania iyengarii Ganesan; Laurencia sp.; Laurencia cruciata Harvey; Laurencia obtusa (Huds.) Lamour; Laurencia papillosa (Forsk.) Greville; Laurencia rigida J. Ag.; Leveilla jungermanniodes (Mart. & Hering.) Harvey; Liagora ceranoides Lamour; Liebmannia laccadivarum Barton; Lingbya majuscula J. Ag.; Lithothamnion fruticulosum (Kuetz.) Foslie; Neomeris annulata Dickie; Padina gymnospora (Kuetz.) Vickers; Padina pavnonica (Linn.) Thivy & Taylor; Pocockiella variegata (Lamour) Papenfuss; Ralfsia ceylanica Harv.; Ralfsia verrucosa (Arech.) C. Ag.; Rhizoclonium grande Boergs.; Sarconema indicum (J. Ag.) Kylon; Sargassum aquilum (Turn) C. Ag.; Sargassum duplicatum Ag.; Sargassum ilicifolium (Turn.) J. Ag.; Spyridia aculeata J. Ag.; Struvea anastamosans Harv. Picosone; Tolypiocladia glamerulata Agardh.; Turbinaria conoides Kuetz.; Turbinaria decurrens Bory.; Turbinaria ornata J. Ag.; Turbinaria turbinata (Linn.) Kuetz.; Ulva fasciata Deliele; Ulva lacinula Linn.; Ulva rigida C. Ag.; Valonia aegagrophiha C. Ag.; Valonia confervoides Hasr.; Valoniopsis pachynema (Martens) Boergs.; Zonaria variegata (Lamour) Ag.
RAO: Lakshadweep: General Features

APPENDIX II

ALPHABETICAL LIST OF FISHES, AMPHIBIANS, REPTILES, BIRDS AND MAMMALS RECORDED FROM LAKSHADWEEP

PISCES

Abalistes stellaris (Bloch & Schneider); Ablennes hians (Valenciennes); Abudefduf annulatus (Peters); Abudefduf bengalensis (Bloch); Abudefduf biocellatus (Quoy and Gaimard); Abudefduf cingulum (Kunzinger); Abudefduf dickii (Lienard); Abudefduf glaucus (Cuvier); Abudefduf lacrymatus (Quoy and Gaimard); Abudefduf manikfani Jones and kumaran; Abudefduf saxatilis (Linnaeus); Abudefduf seolenfasciatus (Cuvier); Abudefduf sexfasciatus (Lacepede); Abudefduf sordidus (Forsskal); Abudefduf uniocellatus (Quoy and Gaimard); Abudefduf xanthozona (Bleeker); Abudefduf zonatus (Cuvier); Acanthocybium solandri (Cuvier); Acanthurus aliala (Lesson); Acanthurus elongatus (Lacepede); Acanthurus leucosternon Bennett; Acanthurus lineatus (Linnaeus); Acanthurus mata Valenciennes; Acanthurus matoides Valenciennes; Acanthurus nigricans (Linnaeus); Acanthurus nigrofuscus (Forsskal); Acanthurus philippinus Herre; Acanthurus tennenti Gunther; Acanthurus triostegus triostegus (Linnaeus); Acentrogobius aestuarius Smith; Acentrogobius caninus (C. & Valenciennes); Acentrogobius cauerensis (Bleeker); Acentrogobius ornatus (Ruppell); Aetobatus narinari (Euphrasen); Albula vulpes (Linnaeus); Alectis ciliaris (Bleeker); Alectis indicus (Rupp.); Alepisaurus ferox Lowe; Allenetta barnesi (Schultz); Alopias vulpinus (Bonnaterre); Amanses sandwichiensis (Quoy and Gaimard); Amanses scopas (Cuvier & Valenciennes); Ambassis corynorhynchus (Cuvier & Valenciennes); Ambassis urotaenia Bleeker; Amblygobius albimaculatus (Ruppell); Amphiprion altocircus Bleeker; Amphiprion bicinctus Ruppell; Amphiprion chrysopterus Cuvier; Amphiprion ephippium (Bloch); Amphiprion nigripes Regan; Anampses ambonensis Bleeker; Anampses caeruleopunctatus Ruppell; Anampses diadematus Ruppell; Anarchias cinctus Smith; Anchovia indica (Vantasselt); Anguilla bicolor McClelland; Antennarius chironectes (Laçepede); Antennarius coccineus (Lesson); Antennarius leprosus (Eydoux and Souleger); Antennarius nummifer (Cuvier & Valenciennes); Antis高等学校 (Cuvier & Valenciennes); Anhias squamipinnis (Peters); Aphareus furcatus (Lacepede); Aphareus rutilans Cuvier & Valenciennes; Apogon coccineus Ruppell; Apogon fragilis Smith; Apogon leptacanthus Bleeker; Apogon nigripes Pfr.; Apogon sanigens Bleeker; Apogonichthys nigripinnis (Cuvier & Valenciennes); Apogonichthys occelatus (Weber); Apolectus niger (Bloch); Apolemichthys trimaculatus (Lacepede); Aporops allfremi Smith; Aprion virescens Valenciennes; Archamia fucata (Cantor); Archamia mozambiquequensis Smith; Ariadne anago (Schlegel); Ariadne purpureus (Alcock); Aspidontus truncatus Fowler; Asteropteryx semipunctatus Ruppell; Antherion africana Smith; Aulostomatomorpha phosphorophis Alcock; Aulostomus chinensis (Linnaeus); Aulostomus leguerei (Risso); Aulostomus thazard (Lacepede); Balistapus undulatus (Mungopark); Balistoides conspicillum (Bloch and Schneider); Balistoides viridescens (Bloch and Schneider); Barraos barrosi Smith; Bathygadus furvescens Alcock; Bathygadus multifilis Gunther; Bathygobius fuscus (Ruppell); Bathygobius petrophilus (Bleeker); Bathypetrois articolor Alcock; Bathypetrois guentheri Alcock; Bathypetrois insularum Alcock; Bathypetrois squamosus Alcock; Belone platyura Bennett; Benthodermus tenuis Gunther; Blennychis
filamentosus Valenciennes; Bolbometapon muricatus (Cuvier & Valenciennes); Bothus pantherinus (Ruppell); Brotula multibarbata (Schl.); Caesio chryssozona Cuvier; Caesio coerulaeus Lacepede; Caesio lunaris Cuvier & Valenciennes; Caesio pisang Bleeker; Caesio tile Cuvier; Caesio xanthotomus Bleeker; Callechelys melanotaenia Bleeker; Callechelys nebulosus Smith; Callionymus spiniceps Regan; Callyodon bataviensis (Bleeker); Callyodon capitaneus (Valenciennes); Callyodon dubius (Benn.); Callyodon frenatus (Lacepede); Callyodon ghobban (Forsk); Callyodon globiceps (Cuvier & Valenciennes); Callyodon hard (Forsk); Callyodon janthochir (Bleeker); Callyodon jordani (Jenkins); Callyodon lepidus (jenyns); Callyodon niger (Forsk); Callyodon pectoralis (Valenciennes); Callyodon scaber (Valenciennes); Callyodon sexvittatus (Ruppell); Callyodon sordidus (Forsk); Callyodon taeniurus (Valenciennes); Canthidermis rotundatus (Proce); Canthigaster amboinesis (Bleeker); Canthigaster bennetti (Bleeker); Canthigaster cinctus (Richardson); Canthigaster margaritatus (Ruppell); Caranx armatus (Forsk); Caranx chrysophrys (Cuvier & Valenciennes); Caranx compressus Day; Caranx crumenophthalmus (Bloch); Caranx ferdau (Forsk); Caranx ignobilis (Forsk); Caranx lepotelepis Cuvier; Caranx lugubris Poey; Caranx malabaricus (Bl. & Schn.); Caranx melanopus Cuvier; Caranx oblongus Cuvier & Valenciennes; Caranx sansan (Forsk); Caranx sexfasciatus Quoy and Gaimard; Caranx streulis Eydoux and Souleyet; Caranus homei (Richardson); Caropus moulani (Petti); Caropus parvipinnis (Kaup); Centropyge multispinis (Playfair); Cephalopholis argus Bloch and Schneider; Cephalopholis boenack (Bloch); Cephalopholis miniatus (Forsk); Cephalopholis pachycentron (Valenciennes); Chaelodon bennetti Cuvier; Chaelodon citrinellus Cuvier; Chaelodon collare Bloch; Chaelodon falcata Bloch; Chaelodon kleinii Bloch; Chaelodon lineolatus Cuvier & Valenciennes; Chaelodon lunula (Lacepede); Chaelodon melanotus Bloch and Schneider; Chaelodon meyeri Bloch and Schneider; Chaelodon trifasciatus Mungopark; Chaelodon unimaculatus Bloch; Chaelodon vagabundus Linnaeus; Chaetodon xanthoccephalus Bennett; Chalixodytes tauensis Schultz; Champsodon capensis Regan; Chanos chanos (Forsk); Chauliodus pammelas Alcock; Chauliodus sloani Bloch & Schneider; Cheilinus arenatus Cuvier & Valenciennes; Cheilinus chlorurus (Bloch); Chelinus diagrammus (Lacepede); Chelinus fasciatus (Bloch); Chelinus eyxephalus Bleeker; Chelinus trilobatus Lacepede; Chelinus undulatus Ruppell; Chelio inermis (Forsk); Cheilodipterius lachneri Klausewitz; Chelone sehl (Forsk); Chiocentrus dorab (Forsk); Chirocentrus brachysoma (Bleeker); Chaoeroichthys sculptus (Gunther); Choridactylus multibarbis Rich.; Chorinemus sp.; Chromis caeruleus (Cuvier); Chromis cinctus (Plfr.); Chromis chrysursus (Bliss); Chromis dimidiatus (Kunzinger); Chromis nigrurus Smith; Chromis opercularis (Gunthei); Chromis simulans Smith; Chromis ternatensis (Bleeker); Cirrhichthys aprinus (Cuver & Valenciennes); Cirrhilabrus exquisitus Smith; Cirrhus pinnulatus (Bloch and Schneider); Cirripectus quagga (Fowler & Ball); Cirripectus sebae (Valenciennes); Cirripectus stigmaticus Strasburg & Schultz; Cirripectus variolosus (Valenciennes); Coelorhynchus flabelispinis (Alcock); Coelorhynchus parallelus (Gunther); Cotingia dussumieri Cuvier & Valenciennes; Conger cinereus Rupp; Coris angulata Lacepede; Coris formosa (Bennett); Coris frerei Gunther; Coris gaimardi (Quoy and Gaimard); Coryphaena hippurus Linnaeus; Corythoichthys fasciatus (Gray); Corythoichthys intestinalis intestinalis (Ramsay); Crenimugil crenilabis (Forskal); Cryptotomus spinidens (Quoy & Gaimard); Ctenochaetus striatus (Cuvier & Valenciennes); Ctenochaetus strigosus (Bennett); Ctenogobius crocineus Smith; Cyclothone microdon (Gunther); Cyclothone signata Garman; Cymolutes lecule (Quoy
& Gaimard); Cynoglossus brachycephalus (Bleeker); Cyprinus carpio Linnaeus; Cypselurus cyanopterus (Valenciennes); Cypselurus fulvus (Mitchill); Cypselurus oligolepis (Bleeker); Cypselurus spiloterus (Valenciennes); Dactyloptena macracanthus (Bleeker); Dactyloptena orientalis (Cuvier); Dascyllus aruanus (Linnaeus); Dascyllus reticulatus (Richardson); Dascyllus trimaculatus (Ruppell); Dasyatis imbricatus (Bloch & Schneider); Dasyatis sephen (Forskal); Dasyatis varnak (Forskal); Decapterus macrosoma Bleeker; Decapterus russelli (Ruppell); Dentrochirus brachypterus (Cuvier); Dentrochirus zebra (Quoy & Gaimard); Dentroscorpaena cirrhosa (Thunbg.); Dermatorum trichiurus Alcock; Diagromma pictum (Thunbg.); Diaphus fulgens (Brauer); Dicrolole intrinigra Goode & Bean; Dinematichis ilucocentoides Bleeker; Diodon hystrix Linnaeus; Dipterygionotus leucogrammicus Bleeker; Doryrhamphus melanopleura (Bleeker); Dussumieria hasselti Bleeker; Duymaria flagellifera (Valenciennes); Echeneis naucrates Linnaeus; Echidna delicata (Kaup); Echidna leucoatena Schultz; Echidna nebulosa (Ahl.); Echidna polyzona (Richardson); Echidna zebra (Shaw); Elagatis bipinnulatus (Quoy and Gaimard); Electrotides helsdingenii Blkr.; Electrotides sexguttatus (Valenciennes); Electrotides strigatus (Broussonet); Elops saurus Linnaeus; Enchelynsana canina (Quoy & Gaimard); Enchelywous kraussi (Klunzinger); Engyprosopon laifrons (Regan); Enomacrodus striatus (Quoy & Gaimard); Entomacrodus vermiculatus (Valenciennes); Epibulus insidiator (Regan); Epinephelus australis (Bloch); Epinephelus coralligera (Valenciennes); Epinephelus elongatus Schultz.; Epinephelus fario (Thunberg); Epinephelus fasciatus (Forskal); Epinephelus flavofasciatus (Lacepede); Epinephelus fuscoguttatus (Forskal); Epinephelus hexagonatus (Bloch and Schneider); Epinephelus melanostigma Schultz; Epinephelus merra Bloch; Epinephelus morrhua (Valenciennes); Epinephelus taurina (Forskal); Epinephelus summana (Forskal); Eulamia limbatus (Muller and Henle); Eulamia melanoptera (Quoy and Gaimard); Euthynnus affinis (Cantor); Eviota distigma Jordan and Seale; Exallias brevis (Kner); Exocoetus solandri Cuvier and Valenciennes; Exocoetus volitans Linnaeus; Fistularia petimba Lacepede; Fistularia villosa Klunz.; Foa brachygramma (Jenkins); Fowlerella bicolor Fowler; Fowleria aurita (Valenciennes); Fusigobius neophytes (Gunther); Galeocerdo cuvieri (Le Seuer); Gasterosteus aculeatus (Forster); Gasterosteus albivittatus (Ruppell); Gasterosteus gaterinus (Forskal); Gasterosteus nigrus (Cuvier); Gasterosteus orientalis (Bloch); Gasterosteus shotaf (Forskal); Gaska minuta (Bloch); Gempylus serpens Cuvier; Gerres filamentosus Cuvier; Gerres lucidus Cuvier; Gerres oblongus Cuvier; Gerres oyena (Forskal); Gnathodentex aurolineatus (Lacepede); Gobiodon citrinus (Ruppell); Gobiodon rivulatus (Ruppell); Gomphosus coeruleus Lacepede; Gomphosus varius Lacepede; Gonostoma elongatum Gunther; Grammatorcynus bicarinatus (Quoy and Gaimard); Grammistes sexlineatus (Thunberg); Gymnapogon africanus Smith; Gymnocaesio argenteus (Bloch); Gymnocranius griseus (Schlegel); Gymnosarda unicolor (Ruppell); Gymnotherax buronensis (Bleeker); Gymnotherax fimbratus (Bennett); Gymnotherax flavimarginatus (Ruppell); Gymnotherax javanicus (Bleeker); Gymnotherax monochrous Bleeker; Gymnotherax monostigma (Regan); Gymnotherax permistus (Smith); Gymnotherax petelli (Bleeker); Gymnotherax pictus (Ahl.); Gymnotherax pseudothyroidea (Bleeker); Gymnotherax reticulatus Bloch; Gymnotherax richardsoni (Bleeker); Gymnotherax ruppellii (McClelland); Gymnotherax undulatus (Lacepede); Halichoeres argus (Bloch and Schneider); Halichoeres bimaculatus Ruppell; Halichoeres centriquadruas (Lacepede); Halichoeres kawrin (Bleeker); Halichoeres marginatus Ruppell; Halichoeres notopsis (Valenciennes); Halichoeres scapularis (Bennett); Halosaurus affinis (Gunther); Halosaurus parvipinnis Alcock; Hemigaleus
balfouri Day; Hemigymnus fasciatus (Bloch); Hemigymnus melapterus (Bloch); Hemiramphus far (Forsk); Hemiramphus marginatus (Forsk); Hemitaurichthys zoster (Bennett); Heniochus acuminatus (Linnaeus); Heniochus monoceros Cuvier; Hippocampus histrix Kaup.; Hippocampus kuda Bleeker; Hirundichthys oxycephalus (Bleeker); Histrion histrion Linnaeus; Holocentrus andamanensis Day; Holocentrus caudimaculatus Ruppell; Holocentrus cornutus Blkr; Holocentrus diadema Lacepede; Holocentrus laeteguttatus Cuvier; Holocentrus laevis Gunther; Holocentrus opercularis Cuvier and Valenciennes; Holocentrus rubber (Forsk); Holocentrus sammara (Forsk); Holocentrus spinifer (Forsk); Holocentrus violaceus Bleeker; Hologymnosus semidiscus (Lacepede); Hyporhamphus dussumieri (Bleeker); Hyporhamphus dussumieri (Valenciennes); Hyperhamphus georgi (Valenciennes); Hyperhamphus unifasciatus (Ranzani); Ichthyocampus belcheri Kaup; Ilisha melanotaenia (Cuvier); Iniistius pavo (Valenciennes); Inimicus filamentosus (Cuvier & Valenciennes); Istiblennius edentulus (Bloch and Schneider); Istiblennius lineatus (Valenciennes); Istiblennius periophthalmus (Valenciennes); Istiomipectus indicus (Cuvier & Valenciennes); Istiophorus platypterus (Shaw & Node); Isurus glauces ( Muller & Henle); Johnius diacanthus (Lacepede); Johnius maculatus Bloch and Schneider; Jordanicus gracilis (Bleeker); Katsuwonus pelamis (Linnaeus); Kraemeria samoensis Steindachner; Kuhlia taeniura (Cuvier); Kyphus cinerascens (Forsk); Kyphus vaigiensis (Quoy and Gaimard); Labrichthys cyanotaenia Bleeker; Labroides dimidiatus (Valenciennes); Lactoria cornuta (Linnaeus); Lactoria forasini (Bianconi); Lagocephalus lagocephalus (Linnaeus); Leiognathus equula (Forsk); Leiognathus fasciatus (Lacepede); Leiuranus seminactus (Lay and Bennett); Lepidochromis brunneus Smith; Lepidoplois axillaris (Benn.); Lepadoplois hirsutus (Lacepede); Lepidozygus tapeinosoma (Bleeker); Leptoscarus vaigiensis (Quoy and Gaimard); Lestidium indopacificum Ege.; Lethrinella microdon (Valenciennes); Lethrinella miniatius (Forster-Schneider); Lethrinella variegatus (Cuvier & Valenciennes); Lethrinella xanhocheilus (Kunzinger); Lethrinus borbonicus (Cuvier & Valenciennes); Lethrinus haraj (Forsk); Lethrinus lent jan (Lacepede); Lethrinus mahsena (Forsk); Lethrinus obsoletus (Forsk); Liachirus melanosomus (Bleeker); Lionurus pumiliceps (Alcock); Liza sp.; Lobotes surinamensis (Bloch); Lophiodon calori (Bianconi); Lutianus bohar (Forsk); Lutianus fulviflamma (Forsk); Lutianus gibbus (Forsk); Lutianus johni (Bloch); Lutianus kasmira (Forsk); Lutianus lineolatus (Rupp.); Lutianus russelli (Bleeker); Lutianus sanguineus (Cuvier & Valenciennes); Lutianus vaigiensis (Quoy and Gaimard); Lutianus meleagris Plfr.; Macolor niger (Forsk); Macroharyngodon melagris (Quoy and Gaimard); Macrourus hextii Alcock; Macrourus nasutus (Gunther); Macrourus woodsmasoni Alcock; Makaira indica (Cuvier); Makaira nigricans Lacepede; Malacanthus latovittatus (Lacepede); Manta birostris (Walbaum); Megalaspis cordyla (Linnaeus); Megalops cyprinoides (Brousson); Megaprotodon strigangulus (Gmelin); Melichthys niger (Bloch); Mene maculata (Bloch and Schneider); Minus inermis Alcock; Minus monodactylus (Bl. & Schn.); Mobula diabolus (Shaw); Monodactylus argenteus (Linnaeus); Monomitopus nigripinnis Alcock; Monotaxis grandoculis (Forsk); Moringua abbreviata (Bleeker); Moringua bicolor Kaup; Moringua javanica (Kauf); Moringua macrochir Bleeker; Moringua microchir Bleeker; Mucogobius liolepis (Koumans); Mulliodichthys auriflamma (Forsk); Mulloidichthys samoensis (Gunther); Muraenichthys macropterus Bleeker; Myctophum affine (Lutken); Myctophum andracae (Lutken); Myctophum aurulaternatum Garman; Myctophum evermanni Gilbert; Myctophum reinhardtii (Lutken); Myctophum spinosum (Steindachner); Myrichthys colubrinus (Boddart); Myrichthys maculosus (Cuvier);
Myripristis adustus Bleeker; Myripristis murdjan (Forskal); Narcetes erimelas Alcock; Naso annulatus (Quoy & Gaimard); Naso brachycentoran (Valenciennes); Naso brevirostris (Valenciennes); Naso lituratus (Bloch and Schneider); Naso tuberosus Lacepede; Naso unicornis (Forskal); Naso vlamingi (Valenciennes); Naucrates dactor (Linnaeus); Nebrius concolor Ruppell; Nemipterus nemurus (Bleeker); Neopythites pterotus Alcock; Novaculaichthys macrolepidotus (Bloch); Novaculaichthys taeniourus (Lacepede); Odonus niger (Ruppell); Omobranchus elongatus (Peters); Omobranchus mekranensis (Regan); Ophichthus marginatus (Peters); Ophichthus altipinins (Kaup); Osbeckia scripta (Osbeck); Ostorchynchus apogonides (Bleeker); Ostorchynchus endekataenia (Bleeker); Ostorchynchus moluccensis (Valenciennes); Ostorchynchus novemfasciatus (Cuvier); Ostorchynchus nubilus (Garman); Ostorchynchus quadrifasciatus (Cuvier); Ostorchynchus sawayensis (Gunther); Ostracion meleagris Shaw; Ostracion sebae (Bleeker); Ostracion tuberculatus Linnaeus; Oxyroncanthus longirostris (Bloch and Schneider); Oxyrhynchus microlepis (Bleeker); Pampus argenteus (Euphrasen); Panchax panchax (Hamilton Buchanan); Paracanthus xanthurus Bleeker; Paracanthus hepatitis (Linnaeus); Paracirrhites forsteri (Bloch and Schneider); Paragobiodon echnicocephalus (Ruppell); Paraluterus prinurus (Bleeker); Paramia quinquelineata (Cuvier); Paramonacanthus choirocephalus (Bleeker); Paramonacanthus oblongus (Temminck and Schlegel); Parapercis hexophilalma (Cuvier); Parapercis nebulosa (Quoy & Gaimard); Parapercis quadrispinosa (Weber); Parapercis triactinopterygius (Bloch); Parapriacanthus guntheri (Kunzinger); Parascorpaena picta (Cuvier); Paraxocoetus brachypterus (Richardson); Parupeneus barberinus (Lacepede); Parupeneus bifasciatus (Lacepede); Parupeneus chryserydros (Lacepede); Parupeneus indicus (Shaw); Parupeneus luteus (Valenciennes); Parupeneus macronemus (Lacepede); Parupeneus pleuro stigma (Bennett); Parupeneus trifasciatus (Lacepede); Pegarus draco Linnaeus; Pempheris oualensis Cuvier; Petrosicirpetes mitratus (Ruppell); Petrosicirpetes pindae Smith; Pheleirichthys lineatus (Menzies); Pisoodonizophis cancrivorus (Richardson); Platax orbicularis (Forskal); Platax pinnatus (Linnaeus); Platax teira (Forskal); Platystelephas crocodilus Tilesius; Platystelephas indicus (Linnaeus); Platystelephas malayanus Bleeker; Platytroctes apus Gunther; Plectromomus maculatus (Bloch); Plesiops caeruleolineatus Ruppell; Plicomugil labiosus (Valenciennes); Plotosus anguillaris (Lacepede); Polymixia japonica Gunther; Polynemus hepadactylus Cuvier; Polynemus plebeius Broussonet; Polynemus sexfilis Valenciennes; Pomacanthodes imperator (Bloch); Pomacanthodes semicirculatus (Cuvier); Pomacentrus albicaudatus Baschierei-Salvadori; Pomacentrus al bifasciatus Schlegel and Muller; Pomacentrus littoralis Cuvier; Pomacentrus lividus (Bloch and Schneider); Pomacentrus melanopterus Bleeker; Pomacentrus nigricans (Lacepede); Pomacentrus paxo (Bloch); Pomacentrus sulphureus Klunzinger; Pomacentrus triactinopterygius (Cuvier & Valenciennes); Pomadasys maculatus (Bloch); Pranesus pinguis (Lacepede); Priacanthus boops (Bloch & Schneider); Priacanthus cruentatus (Lacepede); Priacanthus hamrur (Forskal); Prionobutis koiliomadon (Bleeker); Priotrematogon fraenatus (Valenciennes); Priotrematogon synderi (Jordan & Evermann); Prognichthys gibbifrons (Valenciennes); Promethichthys prometheus (Cuvier); Psenes cyanophirus Cuvier; Psettodes erumei (Schneider); Pseudamia gelatinosa Smith; Pseudobalistes flavimarginatus (Ruppell); Pseudochelinus hexataenia (Bleeker); Pseudochromis dutoit Smith; Pseudochromis tapeinosoma Bleeker; Pseudogramma polyacanthus (Bleeker); Pseudopeneus indicus (Shaw); Pseudorrhombus arsius (Hancock); Psilochalus barbatus (Grey); Ptereleotris microlepis (Bleeker); Ptereleotris tricolor Smith; Pterois antennata (Bloch); Pterois radiata Cuvier; Pterois russelli Bennett; Pterois volitans (Linnaeus);
Puntius burmanicus (Day); Quisquilius eugenius Jordan and Evermann; Quisquilius inhaecae (Smith); Rachycentron canadus (Linnaeus); Rastrelliger kanagurta Ruppell; Remora albescens (Temminck and Schlegel); Remora osteochir (Cuvier); Remora remora (Linnaeus); Rhadamia cypselurus Weber; Rhadamia gracilis (Bleeker); Rhadobasargus sarba (Forskal); Rhina acynlostoma Bloch and Schneider; Rhinecanthus aculeatus (Linnaeus); Rhinecanthus rectangularis (Schneider); Rhineodon typus Smith; Rhinoptera javanica Muller and Henle; Rynchopterus djiddensis (Forskal); Rhynchostracion nasus (Bloch); Runula rhinorhynchos (Bleeker); Runula tapinosoma (Bleeker); Ruviets pretiosus Cocco; Salarias dussumieri Cuvier and Valenciennes; Salarias fasciatus (Bloch); Sarda orientalis (Temminck & Schlegel); Sarda sarda (Cuvier and Valenciennes); Sardinella clupeoides (Bleeker); Sardinella fimbriata (Valenciennes); Sardinella melanura (Cuvier); Sarotherodon mossambicus (Peters); Saurida gracilis (Quoy and Gaimard); Saurida undosquamis Richardson; Scarus dubius (Bennett); Schindleria piettschmanni (Schindler); Schindleria praematura (Schindler); Scoliodon walbeehmi (Bleeker); Scolopsis bilineatus (Bloch); Scolopsis frenatus (Cuvier and Valenciennes); Scomberoides sanscipiteri (Cuvier); Scomberoides tol (Cuvier); Scomberomorus commersoni (Lacepede); Scomberomorus guttatus (Bloch & Schneider); Scopelengys trisitis Alcock; Scorpaenodes guamensis (Quoy and Gaimard); Scorpaenodes parvipinnis (Garrett); Scorpaenopsis cirrhosa (Thunberg); Scorpaenopsis gibbus (Bloch and Schneider); Sebastapistes nuchalis (Gunther); Sebastapistes oglinus (Smith); Sebastapistes strongia (Cuvier); Secutor insidiator (Bloch); Serriolina nigrofasciata (Ruppell); Serrivomer microps (Alcock); Sideria pica (Ahl); Siganus canaliculatus (Bl. & Schneider); Siganus corrallinus (Cuvier & Valenciennes); Siganus javus (Linnaeus); Siganus oramin Bloch & Schneider; Siganus rostratus (Valenciennes); Siganus steallos (Forskal); Sillago sihama (Forskal); Solenostomus cyanopterus Bleeker; Sphaeroides hypselogeneion (Bleeker); Sphyraena barracuda (Walbaum); Sphyraena chinenis Lacepede; Sphyraena chrysotaenia Klunzinger; Sphyraena forsteri Cuvier; Sphyraena jello Cuvier & Valenciennes; Sphyraena novaezelandiae Gunther; Sphyraena zygaena (Linnaeus); Spratelloides delicatulus (Bennett); Spratelloides japonicus (Houttuyn); Stegostoma varium (Seba); Stenaterina temmincki (Bleeker); Sthoehijulis albovittata (Bonnaterre); Sthoehijulis azillaris (Quoy and Gaimard); Sthoehijulis phekadopleura (Bleeker); Sthoehijulis strigiventer (Bennett); Sthoehijulis trilineata (Bloch and Schneider); Stomias affinis Gunther; Strongylura gigantea (Temminck and Schlegel); Strongylura incisa (Valenciennes); Strongylura melanota (Bleeker); Strongylura stryngylura (Van Hasselt); Sulfamens chrysopetera (Bloch and Schneider); Syncnsea horrorida (Linnaeus); Syncnsea verrucosa Bloch and Schneider; Synophobanchus pinnatus (Gronov); Syngnathoides biaculeatus (Bloch); Syngnathus cyanopilus Bleeker; Syngnathus spicer Ruppell; Synodus variegatus (Lacepede); Taenianotus triacanthus Lacepede; Tetraodon hispidus Linnaeus; Tetraodon immaculatus Bloch and Schneider; Tetraodon meleagris Lacepede; Tetraodon nigropunctatus Bloch and Schneider; Tetraodon stellatus Bloch and Schneider; Tetrapturus audax Philippi; Tetrosomus cancatenatus (Bloch); Thalassoma amblycephalus (Bleeker); Thalassoma hardwicki (Bennett); Thalassoma janseni (Bleeker); Thalassoma lunare (Linnaeus); Thalassoma melanochir Bleeker; Thalassoma purpurea (Forskal); Thalassoma quinquemittata (Lay and Bennett); Thalassoma umbrostigma (Ruppell); Thalassosteus appendiculatus (Klunzinger); Therapon jarbua (Forskal); Therapon pura Cuvier; Therapon theraps Cuvier; Thunnus albacares (Bonnaterre); Thunnus obesus (Low); Thunnus sibi (Temminck & Schlegel); Thyrsitoides marlei Fowler; Torpedo marmorata Risso; Trachinotus bailloni (Lacepede); Trachinotus blochi (Lacepede); Triacanthus biaculeatus (Bloch); Triacanthus
brevirostris Schlegel; Triacanthus ethiops Alcock; Trachinotus nieuhofi Bleeker; Triaenodon obesus (Ruppell); Tripterygon fasciatum Weber; Tripterygon gymnauchen Weber; Tripterygon trigloides Bleeker; Trypauchen vagina (Bloch and Schneider); Tylosurus crocodilus (Les); Ulna mandibularis (Macleay); Upeneus arge Jordan and Evermann; Upeneus sulphureus Cuvier & Valenciennes; Upeneus sundaicus (Bleeker); Upeneus tragula Richardson; Upeneus vitatus (Forskal); Uroconger braueri Weber and de Beaufort; Urogymnus africanus (Bloch and Schneider); Uropterygius marmoratus (Lacepede); Uropterygius tigrinus (Lesson); Vairiola louti (Forskal); Vinciguerra lucetia (Garman); Xanodon bipallidus Smith; Xanodon margarius (Cartier); Xenomystax flavescens (Bennett); Zebrasoma veliferum (Bloch); Zen scutatus (Gilchrist and Von Bonde).

AMPHIBIANS

Bufo melanostictus Schneider, Common Indian toad; Rana tigerina Daudin, Common bull frog.

REPTILES

Calotes calotes (Linnaeus), Green lizard; Calotes liticephalus (Gunther), Tree lizard; Calotes versicolor (Daudin), Common garden lizard; Chelonia mydas (Linnaeus), Green turtle; Dermochelys coriacea (Linnaeus), Leatherback turtle; Enhydrina schistosa Daudin, Hook-nosed sea snake; Eremochelys imbricata (Linnaeus), Hawksbill turtle; Gekko smithi Gray, Smith's gecko; Hemidactylus frenatus Schlegel, House gecko; Hydrophis nigrocinclus Daudin, Black-banded sea snake; Hydrophis ornatus Daudin, Black-banded sea snake; Hydrophis spiralis (Shaw), Yellow sea snake; Kerilia jerdoni Gray, Jerdon's sea snake; Lepiochelys olivacea Eschscholtz, Olive Ridley turtle; Lycodon travancoricus Beddome, Travancore wolf snake; Mabuya carinata (Schneider), Common Brahminy skink; Pelamis platurus (Linnaeus), Yellow-black sea snake; Typhlops braminus (Daudin), Common worm snake.

AVES

Alcedo atthis bengalensis Gmelin, Indian small blue Kingfisher; Amaurornis phoenicurus (Pennant), White-breasted waterhen; Anas creca creca Linnaeus, Common teal; Anous stolidus pileatus (Scopoli), Noddy tern; Anous tenuirostris worcesteri (McGregor), White-Capped Noddy; Anthus similis jerdoni Finsch, Brown rock pipit; Ardea cinerea rectirostris Gould, Common heron; Ardeola grayii (Skyes), Indian pond heron; Arenaria interpress interpress (Linnaeus), Turnstone; Bubulcus ibis coromandus (Boddaert), Cattle egret; Butorides striatus javanicus (Horsfield), Little green heron; Calidris alba (Pallas), Sanderling; Calidris minuta (Weisler), Little stint; Calidris temminckii (Leisler), Temminck's stint; Calidris tenuirostris (Horsfield), Eastern Knot; Catharacta skua antarctica (Lessom), Antarctic skua; Charadrius alexandrinus alexandrinus Linnaeus, Kentish plover; Charadrius hiaticula tundrae (Lowe), Eastern ringed plover; Charadrius leschenaultii Lessom, Large sand plover; Charadrius mongolus atrifrons Wagler, Pamirs Lesser sand plover; Circus aeruginosus aeruginosus (Linnaeus), Marsh harrier; Circus macrourus (Gmelin), Pale harrier; Circus pygargus (Linnaeus),
Montague’s harrier; *Coracias bengalensis indica* Linnaeus, Souther roller; *Corvus splendens splendens* Vieillot, The common house crow; *Delichon urbica urbica* (Linnaeus), House martin; *Dromas ardeola* Paykull, Crab plover; *Egretta garzetta garzetta* (Linnaeus), Little egret; *Egretta gularis schistacea* (Hemprich & Ehrenberg), Indian reef heron; *Egretta sacra* (Gmelin), Eastern reef heron; *Elanus caeruleus vociferus* (Latham), Black-winged kite; *Eudynamys scolopacea scolopacea* (Linnaeus), The koel; *Falco tinnunculus tinnunculus* Linnaeus, European kestrel; *Gallinago megala* Swinhoe, Swinhoe’s snipe; *Haliaeetus leucogaster* Gmelin, White-bellied sea-eagle; *Hirundo rustica guturalis* Scopoli, Eastern swallow; *Lanius cristatus cristatus* Linnaeus, Brown shrike; *Larus brunnicephalus* Jerdon, Brown-headed gull; *Larus ridibundus* ridibundus Linnaeus, Black-headed gull; *Milvus migrans govinda* Sykes, Pariah kite; *Motacilla flava thunbergi* Billberg, Grey-headed yellow wagtail; *Nettapus coromandelianus coromandelianus* (Gmelin), Cotton teal; *Numenius arquata arquata* (Linnaeus), Curlew; *Numenius arquata orientalis* Brehm, Eastern Curlew; *Numenius phaeopus phaeopus* (Linnaeus), Whimbrel; *Nycticorax nycticorax nycticorax* (Linnaeus), Night heron; *Oceanites oceanica* Kuhl, Wilson’s petrel; *Oceanodroma monorhis* (Linnaeus) Ashy storm petrel; *Pandion haliaetus haliaetus* Linnaeus, The osprey; *Phaethon aethereus indicus* Hume, Short-tailed tropic bird; *Philomachus pugnax* (Linnaeus), The ruf; *Pluvialis apricaria apricaria* (Linnaeus), Golden polver; *Pluvialis dominica fulva* (Gmelin), Eastern golden polver; *Pluvialis squatarola* (Linnaeus), Grey plover; *Procellaria pacifica* chlororhyncha (Lesson), Wedge-tailed shear water; *Puffinus persicus* Hume, The Persian shearwater; *Sterna albissons albissons* Pallas, Little tern; *Sterna anaethetus anaethetus* Scopoli, Philippine brown-winged tern; *Sterna anaethetus antarctica* Lesson, Southern brown-winged tern; *Sterna bengalensis bengalensis* Lesson, Lesser-crested tern; *Sterna bergii velox* Cretzschmar, Large crested tern; *Sterna dougallii Korustes* (Hume), Rosy tern; *Sterna furcata nubilosa* Sparrman, Sooty tern; *Sterna repressa* Hartert, White-checked tern; *Sterna sumatrana matheusi* Stresemann, WSestern black-naped tern; *Streptopelia orientalis orientalis* (Latham), Turtle clove; *Strix leptogrammica indaneey Sykes, The brown-wood owl; *Sula leucogaster plotus* (Forster), Brown booby; *Sula sula rubripes* Gould, Red-footed booby; *Trianga glareola* Linnaeus, Spotted sand piper; *Tringa hypoleucos* Linnaeus, Common sand piper; *Tringa nebularica* (Gunnerus), Green shank; *Zosterops palpebrosa palpebrosa* (Temminck), White-eye.

**MAMMALS**

*Balenohtera musculus* Linnaeus, Blue Whale; *Delphinus delphis* Linnaeus, Common dolphin; *Felis domestica* Gmelin, Common cat; *Orca* sp., The porpoise; *Rattus rattus alexandrinus* (Geoffroy), House mouse; *Rattus rattus rufescens* (Gray), House mouse; *Suncus murinus* (Linnaeus), Musk shrew.

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MEIOFAUNA

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INTRODUCTION

Nothing was known of the diverse invertebrate groups of the meiofauna inhabiting the littoral algae and coralline sediments of Lakshadweep until the faunistic survey undertaken by the Zoological Survey of India in the years 1979-80. Results of the preliminary survey carried out on the meiofauna were published by Rao and Misra (1983). Further study of the material collected during subsequent surveys of these oceanic atolls in 1983 and 1987 have resulted in the discovery of more number of species. Based on the study of the above material, the present paper gives a systematic account of 152 species belonging to the groups of Hydrozoa, Turbellaria, Nematoda, Gastrotricha, Archiannelida, Polychaeta, Copepoda, Isopoda, Tardigrada, Halacarida and Gastropoda. Six species of the Gastrotricha are described here as new to science. Part of the material of meiofauna, however, still remains to be studied and identified. Further investigations on these atolls are likely to reveal the existence of more number of meiofauna species in the littoral and sub-littoral regions.

The present collections of meiofauna were largely made from sheltered algae and sandy sediments of the lagoon beaches on the western side of these islands. All the species recorded here were collected by the author following the standard methods recommended for the study (Hulings and Gray, 1971). The soft fauna was examined in fresh condition, while the hard fauna was preserved in 5% neutral formalin containing 2% glycerine for subsequent study and identification. Lengths and widths of minute morphological characters are given in micrometers. Many figures of the meiofauna were drawn from life. Whole mounts of the specimens were made in glycerine gelly and ringed with nail-polish.

LIST OF MEIOFAUNA SPECIES

HYDROZOA

1. Halammohydra octopodides Remane, 1927.

TURBELLARIA


NEMATODA

42 Slate Fauna Series 2: Fauna of Lakshadweep


**GASTROTRICHA**


**KINORHYNCHA**


**ARCHIANNELIDA**


**POLYCHAETA**

RAO: Meiofauna


COPEPODA


ISOPODA


TARDIGRADA


HALACARIDA

149. Halacarus anomalus Trouessart, 1894.
MOLLUSCA


SYSTEMATIC ACCOUNT

Phylum CNIDARIA
Class HYDROZOA
Order ACTINULIDA
Family HALAMMOHYDRIDAE

Genus Halammohydra Remane, 1927

1. Halammohydra octopodides Remane


Material examined : 1 ex., Androth, 22.2.83; 1 ex., Androth, 24.2.83.

Diagnostic features: Aberrant cnidarian with body entirely ciliated. Gastric tube elliptical. Aboral cone globular with well developed adhesive organ occupying about half the upper part of cone. Neck short and slender. Tentacles in two whorls of 5+5, alternating with a whorl of 5 statocysts of the lithostyle type. Cnidome with micro and macrostenoteles. Microstenoteles of two size categories. Anterior tentacles directed forwards during locomotion, while the posterior ones trail behind.

Measurements: Length 0.4 – 0.5 mm and maximum diameter 0.2 mm

Remarks: Remane described the species from Baltic and North Sea coasts. Rao and Ganapati (1965) reported the species for the first time from Indian waters. The present material showed some variation from original description mainly in the structure of cnidome. Further, because of the geographical isolation of these areas investigated, it is quite possible that the Indian specimens represent a different species or subspecies.

Habitat: Coarse coralline sand 5 cm below surface between low and half-tide levels, intertidal zone.

Distribution: Baltic Sea, North Sea, North Atlantic, Mediterranean, Arabian Sea, Bay of Bengal.

Phylum PLATYHELMINTHES
Class TURBELLARIA
Order MACROSTOMIDA
Family MACROSTOMIDAE
Genus Acanthomacrostomum, Papi and Swedmark, 1959

2. Acanthomacrostomum gerlachi Ax


Material examined : 2 ex., Kavaratti, 18.2.83; 1 ex., Minicoy, 15.3.83.
Diagnostic features: Aberrant turbellarian. Body flat, oblong and leaf-like. Head truncate and tail pointed. Internal skeleton of spicules directed posteriorly and posterolaterally in 6-8 transverse rows. Spicule size increases from anterior end to posterior end. Mouth ventral and located about one fourth of total body length from anterior end. Ventrolateral margins are supplied with clusters of gland cells and the species is highly thigmotactic. Exclusively psammophilous.

Measurements: Length 0.4-0.8 mm and maximum width 0.1-0.2 mm.

Remarks: The material conforms with the original description of the species from Maldives. As pointed out by Ax (1971), *A. spiculiferum* Papi and Swedmark 1959 recorded by Rao (1969) on Orissa coast is to be treated as *A. gerlachi*. Hence, this is the first record of the species from Indian waters.

Habitat: Coarse sand with fine shell gravel 5 cm below surface between low and high tide levels, intertidal zone.

Distribution: Maldives, Lakshadweep, Indian subcontinent, Andaman Islands.

Order SERIATA
Family OTOPLANIDAE
Genus Otoplana Du Plessis, 1989

3. Otoplana subterranea Ax-


Material examined: 2 ex., Minicoy, 13.3.83; 1 ex., Minicoy, 15.3.83; 2 ex., Kavaratti, 3.2.87.

Diagnostic features: Body elongated and dorsoventrally flattened, with numerous sensory bristles on the anterior margin. Mid-dorsal statocyst occurs about 2 head diameters from anterior end. Body transparent and highly thigmotactic. Adhesive papillae 6-8 pairs on tail. Central funnel tube of the copulatory organ is conical, while the stylets have bifurcated tips unequal in length. Ventral proboscis located about half the length of body.

Measurements: Length 0.8 - 1.0 mm and width 0.08 - 0.10 mm.

Remarks: According to the original description, the type specimens attained a length of 0.7-0.8 mm, while the local forms are considerably longer. The central funnel tube and stylets are also proportionately longer in Lakshadweep specimens compared to the baltic specimens. This species is a new record for the fauna of Lakshadweep.

Habitat: Medium and coarse coralline sand 5-10 cm below surface between low and half-tide levels, intertidal zone, lagoon beach.

Distribution: Coasts of Baltic Sea, North Sea, Mediterranean, Arabian Sea and Bay of Bengal.

Order NEORHABDOCOELA
Family POLYCYSTIDAE
Genus Gyratrix Ehrenberg, 1831

4. Gyratrix hermaphroditus Ehrenberg

Material examined: 2 ex., Agatti, 7.2.87.

Diagnostic features: Small unsegmented worms with spindle-shaped body. Pharynx bulbose and opens ventrally about half the length of body. A protrusible, glandulomuscular undivided proboscis at the anterior end present. Two dark eyes occur behind proboscis. Testis tubular and runs anteriorly. Copulatory bursa with a chitinous lining. Penis stylet enclosed in a sheath at the posterior end. Gonads occur lateral to the gut.

Measurements: Length 1.8-2.0 mm and maximum width 0.3 mm.

Remarks: The material examined conforms well with the detailed description and figures of the species given by Meixner (1925).

Habitat: Coarse and medium coralline sand rich in organic detritus, intertidal zone, lagoon beach.

Distribution: Cosmopolitan in fresh, brackish and salt-water habitats.

Phylum NEMATODA
Class APHASMIDEA
Order ENOPLIDA
Family ANTICOMIDAE
Genus Anticoma Bastian, 1865

5. Anticoma arctica Steiner

Material examined: 2 ex., Minicoy, 12.3.83; 1 ex., Kavaratti, 19.3.83.

Diagnostic features: Cuticle with faint striation. Prominent lateral fields. Labial papillae distinct. Cephalic setae short and 0.25 head diameter long. Four somatic setae located about 1.5 head diameters from anterior end. Stoma curved and slightly sclerotized. Amphids distinct, cup-shaped and 0.2 head diameter wide. Excretory ampulla prominent and the pore opens at the level of amphid. Tail conical-cylindrical. Caudal gland 3-celled. Spicule in male 0.8 anal diameter long.

Measurements: Length 1.8–2.0 mm. Tail 5.0–6.5 anal diameters long in male and female specimens, respectively.

Remarks: The present specimens agree well with the original description of the species except for the variation of body size and the position of amphids in both the sexes. This is the first record of the species from Lakshadweep.

Habitat: Fine and medium coralline sand with little detritus between low and high water levels, intertidal zone.

Distribution: Arctic Sea, North Sea, Atlantic, Pacific, Red Sea, Bay of Bengal.

6. Anticoma acuminata (Eberth)

Material examined: 1 ex., Kavaratti, 19.3.83; 1 ex., Kavaratti, 2.2.87.

Diagnostic features: Labial papillae distinct. Cephalic setae less than half the head diameter. Excretory ampulla prominent. Excretory pore one head diameter behind the
anterior end. Amphid distinct, cup-shaped and lies at the level of excretory pore. Five somatic setae occur about 2.4 head diameters from anterior end. Tail conical-cylindrical, with 3-celled caudal gland. Spicule in male curved and 48 µm or 1.6 anal diameters long.

**Measurements**: Length 1.8 mm. Tail 6.0–6.2 anal diameters long.

**Remarks**: The specimen examined conforms well with the description of figures of the species given by Gerlach (1962), but for the minor variation in relative measurements of the body.

**Habitat**: Fine coralline sand and algal thalli near low water level, lagoon beach.

**Distribution**: Cosmopolitan.

7. *Anticoma lata* cobb


**Material examined**: 4 ex., Minicoy, 14.3.83; 1 ex., Minicoy, 15.3.83.

**Diagnostic features**: Cuticle with weak striation. Lateral fields and labial papillae distinct. Cephalic setae are less than half the head diameter long. Four somatic setae located about 4 head diameters from anterior end. Amphid distinct, cup-shaped, 0.25 head diameter long and located about 1.5 head diameters from anterior end. Excretory pore located about 100 µm from anterior end. Nerve ring located 58% from anterior end. Spicule in male curved and 1.25 anal diameters long. Tail conical-cylindrical with 2-celled caudal gland. Spinnert present.

**Measurements**: Length 1.5–1.8 mm. Tail in male 6.5 anal diameters and in female 8.5 anal diameters long.

**Remarks**: The material examined conforms well with the description of the species given by Gerlach (1962) from Maldives. This species is a new record for the Indian coast.

**Habitat**: Fine coralline sand from the thalli of littoral algae near low water level, intertidal zone.

**Distribution**: Widely distributed on the coasts of Indian, Pacific and Atlantic Oceans.

Family **LEPTOSOMATIDAE**

Genus **Platycoma** Cobb, 1893

8. *Platycoma africanum* (Garlach)


**Material examined**: 2 ex., Agatti, 7.2.87.

**Diagnostic features**: Body very long and cylindrical. Cuticle smooth and transparent. Labial papillae indistinct, cephalic setae 1.0, head diameter long. Amphid prominent, cup-shaped and 0.3 head diameter width in female. Amphid triangular and 0.5 head diameter wide in male. Spicule in male is bent and 1.2 anal diameters long. Tail short and ends in an acute tip. Numerous cervical setae occur 3 head diameters from anterior end. Excretory pore located about 4.0 head diameters from anterior end. Nerve ring 48%.
Measurements: Length 10.0–12.0 mm. Tail 2.8 anal diameters long.

Remarks: The material examined conforms well with the original description of species but for the longer body size.

Habitat: Medium and coarse coralline sands rich in detritus between low and half-tide levels, intertidal zone.

Distribution: Red Sea, Maldives, Lakshadweep, India, Andaman Islands.

Family OXYSTOMINIDAE
Genus Oxystomina Filipjev, 1921

9. Oxystomina alpatovi (Filipjev)

Material examined: 3 ex., Minicoy, 12.3.83; 2 ex., Minicoy, 4.3.83.

Diagnostic features: Cuticle smooth, thin and transparent. Lips short and distinct. Six cephalic setae just behind lips are 0.5 head diameter long. Four cervical setae occur 1.2 head diameters behind the cephalic setae. Amphid horse-shoe shaped and located 5.0 head diameters from anterior end. Excretory pore located about 200 μm from anterior end. Tail conical-cylindrical and bluntly rounded at the tip with an inflated cuticle. Spicule in male is curved and 1.2 anal diameters long.

Measurements: Length 2.0–2.4 mm. Tail 6.0 anal diameters long.

Remarks: The specimens correspond well with the description and figures of the species given by Gerlach (1962) from Maldives. This is the first record of the species from Lakshadweep.

Habitat: Fine and medium coralline sand with little detritus, sublittoral zone of the lagoon.

Distribution: Coasts of Atlantic and Indian Oceans.

Genus Porocoma Cobb, 1920

10. Porocoma striata cobb

Material examined: 1 ex., Amini, 28.1.87; 3 ex., Chetlat, 29.1.87.

Diagnostic features: Cuticle finely striated with distinct transverse annulation and longitudinal ridges. Labial papillae distinct. Six cephalic setae 1.8 head diameters long. Excretory ampulla prominent, with the pore located 2.5 head diameters from anterior end. Amphid distinct, horse-shoe shaped and located about 2.2 head diameters from anterior end. Tail cylindrical and tapers posteriorly. Spicule in male 1.5 anal diameters long. Caudal gland 4-celled. Spinnert present.

Measurements: Length 0.8–1.0 mm. Tail 10-12 anal diameters long.

Remarks: The specimens examined agreed well with the descriptions and figures of the species given by Gerlach (1962) from Maldives. This is the first record of the species from Indian Coast.

Habitat: Fine coralline sand from the thalli of littoral algae near low water level, lagoon beach.
**Distribution**: Widely distributed along the coasts of Atlantic, Pacific and Indian Oceans.

**Genus Halalaimus De Man, 1888**

11. *Halalaimus filum* Gerlach


*Material examined*: 7 ex., Agatti, 8.2.87; 2 ex., Agatti, 9.2.87.

*Diagnostic features*: Body filiform. Cuticle finely striated. Head with 0.2 diameter of body at hind end of oesophagus. Six cephalic and 4 cervical setae slightly longer than 1.0 head diameter. Amphid cylindrical, 8.0 head diameters long and located about 20 μm from anterior end. Tail very long, conical anteriorly and filiform posteriorly. Spicule in male is about 1.5 anal diameters long. Accessory plate indistinct.

*Measurements*: Length 1.8–2.2 mm. Tail reaches about 42.0 anal diameters long.

*Remarks*: The specimens examined correspond well with the description and figures of the species made from Maldives (Gerlach, 1962), except for minor variations in the relative measurements of the body.

*Habitat*: Fine coralline sediment from the thalli of littoral algae near mid-water level, intertidal zone.

*Distribution*: Widely distributed along the coasts of Atlantic and Indian Oceans.

12. *Halalaimus supercirrhatus* Gerlach


*Material examined*: 7 ex., Kiltan, 2.3.83; 1 ex., Kiltan, 3.3.83.

*Diagnostic features*: Body filiform. Cuticle fine and transparent. Head diameter about 0.3 body diameter at the esophageal base. Labial papillae small and indistinct. Six cephalic and 4 cervical setae 6.0–8.0 head diameters long. Amphid linear, indistinct and situated about 8.0 head diameters from anterior end. Tail conical-filiform. Spicule in male is slightly less than 2.0 anal diameters long. Gubernaculum obscure.

*Measurements*: Length 1.8–2.0 mm. Tail 12–15 anal diameters long.

*Remarks*: The specimens agreed well with the original description of the species made from El Salvador on the South American coast and the Maldives in the Indian Ocean (Gerlach, 1962).

*Habitat*: Fine and medium coralline sand with little detritus between low and mid-water levels, intertidal zone.

*Distribution*: Widely distributed on the coasts of Pacific, Atlantic and Indian Oceans.

13. *Halalaimus sp.*

*Material examined*: One ex., Kavaratti, 18.2.87.

*Diagnostic features*: Body filiform. Cuticle thin, transparent and finely striated. Head diameter about 0.5 body diameter at the esophageal base. Neck tapers gradually to the anterior end. Cephalic and cervical setae 1.8 head diameters long. Amphid cylindrical, 28 μm long and situated about 4.8 head diameters from anterior end. Tail

**Measurements** : Length 1.6 mm. Tail 24.0 anal diameters long.

**Remarks** : The single specimen examined closely approaches *H. setosus* Timm (1961) described from the Bay of Bengal. Specific identification of the species requires further study.

**Habitat** : Fine silty sediment on algal thalli near low water level, intertidal zone, lagoon beach.

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**Family** AXONOLAIMIDAE  
**Genus** Odontophora Buetschli, 1874

14. *Odontophora furcata* Wieser  
**Material examined** : 2 ex., Bangaram, 10.2.87; 1 ex., Agatti, 11.2.87.  
**Diagnostic features** : Cuticle finely striated. Six small cephalic papillae occur on anterior border of head. Cephalic setae 1.0–1.9 head diameters long, the setae in males being longer than those in females. Numerous somatic setae 0.5 head diameter long occur posterior to the cephalic setae. Amphid distinct, a circular loop and 0.3 head diameter wide. Buccal cavity deep. Three mandibles present with well developed teeth. Tail conical. Spicule in male curved and about 1.0 anal diameter long. Gubernaculum short and bent backwards.

**Measurements** : Length 2.0–2.4 mm. Tail 3.5 anal diameters long in female and 2.0 anal diameters in male.

**Remarks** : The species is readily distinguished by the characteristic buccal jaws. The material examined conforms well with the original description except for minor variations in the relative measurements of the body.

**Habitat** : Medium and coarse coralline sand 5 cm below surface between low and half-tide levels, intertidal zone.

**Distribution** : Recorded on the coasts of Pacific, Atlantic and Indian Oceans.

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**Family** LEPTOLAIMIDAE  
**Genus** Cynura Cobb, 1920

15. *Cynura papillata* Gerlach  
**Material examined** : 3 ex., Agatti, 7.2.87; 1 ex., Agatti, 9.2.87.  
**Diagnostic features** : Cuticle with deep striation, the annulations being 1.5 μm wide. Lips prominent. Cephalic setae 1.5 head diameters long. Amphid distinct, circular and 0.3 head diameter wide. Button-like labial papillae present on the anterior region. Buccal cavity spacious, cylindrical and 40 μm deep. Oesophagus highly muscular, with a distinct posterior bulb. Tail short and conical. Spicule in male 60 μm or about 1.0 anal diameter long. Two preanal supplements on the ventromedian surface are 30 and 40 μm long. Gubernaculum spatula-like and bent at right angles.
Measurements : Length 1.8–2.0 mm. Tail 2.0 anal diameters long.

Remarks : The present material corresponds well with the original description of the species made from Maldives. Minor variations, however, occurred in the disposition of the preanal papillae, which are arranged more closely in the local specimens. This is the first record of the species from Lakshadweep.

Habitat : Coarse and clean coralline sand 5 cm below surface near low water level, lagoon beach.

Distribution : Maldives, Lakshadweep, India.

Family ONCHOLAIMIDAE
Genus Oncholaimus Dujardin, 1845

16. Oncholaimus brachycercus De Man

Material examined : 2 ex., Kavaratti, 2.2.87; 1 ex., Agatti, 7.2.87.

Diagnostic features : Cuticle smooth and transparent. Head diameter 52 μm. Lips, labial papillae and buccal teeth prominent. Buccal cavity deep and wide, with heavily cuticularized walls. Ten cephalic setae 0.15 head diameter wide present. Amphid width about 1/3 of the corresponding body diameter. Few scattered cervical setae present. Excretory pore about 3 head diameters from anterior end. Tail short and conical, with a spinneret. Cement glands well developed with long ducts. Spicule in male 120 μm or 2.2 anal diameters long. Gubernaculum obscure. About ten preanal and postanal setae present.

Measurements : Length 3.0–3.5 mm. Tail 1.4 anal diameters long.

Remarks : The specimens examined agree with the original description of the species except for the longer spicules in male specimens. This is the first record of the species from Lakshadweep.

Habitat : Coarse and medium coralline sands between low and half-tide levels, intertidal zone, lagoon beach.

Distribution : Baltic Sea, North Sea, Arctic, Atlantic and Indian Oceans.

Order CHROMADORIDA
Family COMESOMATIDAE
Genus Sabatieria Re Rouville, 1903

17. Sabatieria hilarula De Man

Material examined : 1 ex., Minicoy, 15.3.83; 1 ex., Kavaratti, 14.2.87.

Diagnostic features : Cuticular punctuation homogeneous. Labial papillae distinct. Labial setae minute. Four cephalic setae 0.8 head diameter long. Cervical setae in 4 groups of 5-10 each and 0.9 head diameter long. Amphid spiral with 4 turns and 0.5 head diameter wide. Oesophageal base swollen into a bulb. Tail conical-cylindrical with 3 terminal spines. Caudal glands well developed. Excretory pore 65%. Spicule in male 50 μm or 1.5 anal diameters long. Gubernaculum with triangular apophysis. Preanal supplements obscure.
Measurements: Length 1.0–1.2 mm. Tail 4.0–4.2 anal diameters long.

Remarks: Compared to the original description of the species, the specimens from Lakshadweep show minor variation in relation to the Demanian values. The material, however, corresponds well with the description and figures of the species given by Timm (1961) from Bangladesh.

Habitat: Weeds, algae and surface sand near low water level, intertidal zone, lagoon beach.

Distribution: Eurytopic on the coasts of Mediterranean, Atlantic and Indian Oceans.

18. Sabatieria abyssalis (Filipjev)


Material examined: 2 ex., Minicoy, 12.3.83; 1 ex., Minicoy, 15.3.83.


Measurements: Length 1.5–1.8 mm. Tail 4.6 anal diameters long.

Remarks: The material studied agrees well with the original description of the species.

Habitat: Fine coralline mud and medium sand with detritus near low water level, intertidal zone, lagoon beach.

Distribution: Mediterranean Sea, Black Sea, Atlantic, Bay of Bengal, Lakshadweep.

Family CHROMADORIDAE
Genus Chromadora Bastian, 1865

19. Chromadora vulgaris Bastian


Material examined: 3 ex., Minicoy, 14.3.83.


Measurements: Length 1.8–2.0 mm. Tail 4.5 anal diameters long.

Remarks: The material from Minicoy agrees well with the description of the type
species except for the minor variations in the relative measurements of body. This species is recorded for the first time from Lakshadweep.

**Habitat**: Algae and detritus sand in the littoral zone, lagoon beach.

**Distribution**: Coasts of Atlantic and Indian Oceans.

**Genus** Spilophorella Filipjev, 1918

20. Spilophorella paradoxa (De Man)


**Material examined**: 4 ex., Androth, 13.2.83.

**Diagnostic features**: Cuticular ornamentation typical of the genus with transverse striation and punctation. Lateral and sublateral dots distinct. Head diameter 10 μm. Four cephalic setae 0.4 head diameter long. Buccal cavity deep and funnel-shaped. A solid dorsal tooth present. Few short cervical setae 3 μm long present. Nerve ring 48%. Oesophageal bulb double, the anterior chamber being smaller than the posterior one. Excretory pore situated about 50 μm behind anterior end. Tail conical and tapers posteriorly to a point. Spicule in male 1.8 anal diameters long.

**Measurements**: Length 5.0–6.0 mm long. Tail 6.5 anal diameters long.

**Remarks**: The specimens examined conform well with the original description of the species, except for minor variations in the Demanian values. This species is recorded for the first time from Lakshadweep.

**Habitat**: Medium coralline sand rich in organic detritus and algal thalli in the littoral zone, lagoon beach.

**Distribution**: Cosmopolitan.

Family CHONIOLAIMIDAE

**Genus** Halichoanolaimus De Man, 1886

21. Halichoanolaimus robustus (Bastian)


**Material examined**: 2 ex., Kalpeni, 13.2.87; 1 ex., Kavaratti, 3.2.87.

**Diagnostic features**: Cuticle finely striated and punctate. Head truncate anteriorly. Labial papillae short with 10 short labial setae. Cephalic setae much reduced. Amphid distinct, 3.5 spiral and attains about 0.3 head diameter wide. Buccal cavity spacious with longitudinal septa and granular bodies. Tail conical-cylindrical, ending in finger-like tip. Spicule in male 30 μm or about 1.2 anal diameters long. Three short preanal pricks present. Gubernaculum obscure.

**Measurements**: Length 1.0–1.6 mm. Tail 2.0–3.0 anal diameters long.

**Remarks**: This species reported from different global regions exhibited only minor variations in its external morphology (Gerlach, 1964). The specimens collected from Lakshadweep, however, corresponded well with the figures and description of the species given by Gerlach. This is the first record of the species from Lakshadweep.

**Habitat**: Coarse and medium coraline sand near low water level, lagoon beach.
Distribution: Widely distributed along the coasts of Atlantic, Pacific and Indian Oceans.

Genus Latronema Wieser, 1954

22. Latronema orcinum (Gerlach)


Material examined: 3 ex., Minicoy, 15.3.83.

Diagnostic features: Ornamentation of cuticle on the head region consists of unipunctate rows interrupted by several longitudinal lines. Labial setae prominent and about 10 μm long. Cephalic setae indistinct. About 15 setae occur in a circle representing cephalic and cervical setae. Three jaws present anteriorly at the apex of pharynx, each jaw bearing four bifid and three simple teeth. Amphid indistinct. Tail short and conical. Spicule in male about 1.5 anal diameters long. About 12 preanal papillae occur in male. Gubernaculum obscure.

Measurements: Length 1.0–1.5 mm. Tail 1.5–2.0 anal diameters long.

Remarks: This species recorded from different global regions showed little variation of the cuticular ornamentation characteristic of the species. The specimens collected from Lakshadweep, however, agreed well with the description of the species made by Gerlach (1964) from Maldives. This is the first record of the species from Lakshadweep.

Habitat: Coarse and medium coralline sand between low and half-tide levels, lagoon beach.

Distribution: Widely distributed along the coasts of Atlantic and Indian Oceans.

Family SELACHINEMATIDAE

Genus Synonchium Cobb, 1920

23. Synonchium obtusum Cobb


Material examined: 2 ex., Kavaratti, 3.2.87.

Diagnostic features: Cuticular punctuation shows distinct horizontal differentiation. Labial papillae small and conical. Ten cephalic papillae are flat and button-like. Somatic setae are replaced by conical papillae. Circular pores present on body. Pharynx with 3 powerful jaws characteristic of the species. Amphid distinct and 2.5 spiral. Spicule in male is straight and 75 μm long. Accessory part indistinct. Tail very short and ends in a blunt point. Preanal papillae absent. Cuticular ridges occurring on either side of cloaca are supported by saccular papillae.

Measurements: Length 1.8–2.0 mm long. Tail about 0.5 anal diameter long.

Remarks: The material examined conforms with the original description and the more recent description of the species given by Gerlach (1964) from Maldives.

Habitat: Coarse coralline sand with fine silt and little detritus between low and half-tide levels, intertidal zone, lagoon beach.

Distribution: Eurytopic on the coasts of tropical and temperate seas.
Family CYATHOLAIMIDAE
Genus Paracyatholaimus Micoletzky, 1922

24. Paracyatholaimus duplicatus Gerlach


Material examined: 2 ex., Minicoy, 10.3.83; 1 ex., Minicoy, 14.3.83.

Diagnostic features: Cuticular ornamentation with numerous pin-pricks. Labial papillae small. Cephalic setae 0.4 head diameter long. Amphid distinct with 5 spirals with a maximum width less than 0.5 head diameter. Oesophageal bulb lacking. Tail conical-filiform. Spicule in male 50 μm or about 1.0 anal diameter long. Accessory apparatus plate-like. Paired preanal papillae present. Filiform part of tail is about 0.1 anal diameter wide. Outer edge of spicular apparatus with a group of pricks.

Measurements: Length 1.5–1.8 mm. Tail 5.5–6.5 anal diameters long.

Remarks: The material examined corresponds well with the original description of the species made from Maldives.

Habitat: Coarse coralline sand rich in organic detritus below low water level, lagoon beach.

Distribution: Maldives, Lakshadweep.

Family SPIRINIDAE
Genus Metachromadora Filipjev, 1918

25. Metachromadora clavata Gerlach


Material examined: 1 ex., Amini, 28.1.87; 3 ex., Chetlat, 29.1.87.

Diagnostic features: Cuticle finely striated. Lips distinct. Labial setae minute. Cephalic setae about 5 μm or 0.3 head diameter long. Numerous short somatic setae present. Amphid 10 μm or 0.6 head diameter wide with 2 spirals. Buccal cavity 20 μm deep. Oesophagus highly muscular and ends posteriorly in a cylindrical bulb with 2 transverse septa. Tail conical. Caudal gland 3-celled. Spicule in male is about 30 μm or 1.0 anal diameter long. Gubernaculum with pointed distal end and 15 μm long. Button-like preanal papillae occur on the ventro-median surface.

Measurements: Length 1.0–1.2 mm. Tail 1.5 anal diameters long.

Remarks: The conical cephalic papillae, partitioned pharyngeal bulb and the preanal papillae are characteristic of the species. The specimens examined agreed well in all the essential features with the description of species given by Gerlach (1963) from Maldives.

Habitat: Fine and medium coralline sand with little detritus below low water level of the lagoon beach.

Distribution: Coasts of Atlantic and Indian Oceans.

Genus Chromaspirina Filipjev, 1918

26. Chromaspirina madagascariensis Gerlach

Material examined: 3 ex., Kavaratti, 6.3.83; 1 ex., Minicoy, 15.3.83; 2 ex., Agatti, 6.2.87.

Diagnostic features: Cuticle finely ringed. Head bluntly rounded anteriorly. Four cephalic and sub-cephalic setae are 0.3 head diameter long. Amphid conspicuous, circular, 1.5 spiral and 0.4 head diameter wide. Cuticular annulation starts from the level of amphid. Buccal cavity wide and funnel-like. Oesophagus with a posterior bulb having 2 internal valves. Tail conical. Spicule in male is about 25 \( \mu \text{m} \) or 1.0 anal diameter long and curved, with the distal part expanded. Gubernaculum an epsilon-like plate. Preanal and postanal supplements obscure.

Measurements: Length 0.8–1.0 mm. Tail 3.0 anal diameters long.

Remarks: The species is readily distinguished from other members of the genus by the structure of the cephalic setae and the pharyngeal bulb with 2 internal valves. This is the first record of the species from Lakshadweep.

Habitat: Coarse and medium coralline sand 10 cm below surface near mid-water level, intertidal zone, lagoon beach.

Distribution: Madagascar, Maldives, Lakshadweep, India.

Genus **Spirinia** Gerlach, 1963

27. **Spirinia laevioides** Gerlach


Material examined: 2 ex., Kalpeni, 13.2.87.

Diagnostic features: Cuticle finely ringed. Labial setae minute. Cephalic setae 0.6 head diameter long. Numerous somatic setae present, about 0.8 head diameter long. Amphid distinct, circular and 0.4 head diameter wide. Cuticular annulation starts anteriorly from the anterior border of amphid. Mouth circular. Oesophagus with a distinct posterior bulb. Nerve ring occurs about the middle of oesophagus. Tail conical-cylindrical. Spicule in male 50 \( \mu \text{m} \) or 1.6 anal diameters long, with distal part expanded. Gubernaculum short and simple. Preanal papillae absent.

Measurements: Length 1.2–1.5 mm. Tail 3.5–4.0 anal diameters long.

Remarks: The specimen conformed well with the original description of the species from Maldives.

Habitat: Fine detritus coralline sand from algal thalli near low water level of the lagoon beach.

Distribution: Maldives, Lakshadweep, India.

Family **DESMODORIDAE**

Genus **Desmodora** De Man, 1889

28. **Desmodora megalosoma** Steiner


Material examined: 3 ex., Kadamat, 26.1.87.

Diagnostic features: Cuticular annulation faintly ringed, with longitudinal lines. Cephalic setae short, about 5–6 \( \mu \text{m} \) or 0.4 head diameter long. The setae are longer in
female than in male. Amphid conspicuous with 3.5 spirals, 10 µm or 0.5 head diameter wide in female and 15 µm or 0.6 head diameter wide in male. Buccal cavity cylindrical and 40 µm long, with cuticular plates in the anterior region. Oesophageal bulb bilobed posteriorly, the lobes being larger in size in males than in females. Tail short and conical. Spicule in male curved and 1.0–1.3 anal diameters long. Accessory plate 0.6 anal diameter long. A preanal papilla occurs on the ventral surface in front of anus.

*Measurements*: Length 1.5–1.8 mm. Tail 2.0–4.5 anal diameters long. The tail is longer in females than in males.

*Remarks*: The material examined agrees well with description and figures of the species given by Gerlach (1963).

*Habitat*: Fine detritus coralline sand below low water level, lagoon beach.

*Distribution*: Coasts of Atlantic and Indian Oceans.

Order DESMADORIDA
Family DESMODORIDAE
Genus Desmodora De Man, 1889

29. Desmodora brevicollis (Cobb)

*Material examined*: 1 ex., Chetlat, 29.1.87; 1 ex., Minicoy, 14.3.83.

*Diagnostic features*: Cuticular annulation deeply ringed and about 1 µm wide. Labial papillae very short. Cephalic setae longer than one head diameter. Numerous somatic setae longer than body diameter. Amphid distinct, 2.5 spiral and 0.5 head diameter wide. Tail conical-cylindrical. Buccal cavity cuticularised. Pharyngeal bulb distinct and 18 µm wide. Spicule in male about 1.0 anal diameter long. Accessory plate present.

*Measurements*: Length 0.8–1.0 mm. Tail 4.0 anal diameters long.

*Remarks*: The specimens examined conform with the description of the species given by Garlach (1963) from Maldives in the Indian Ocean. This species is a new record for Indian waters.

*Habitat*: Surface layers of fine detritus sand between low and half-tide levels, intertidal zone, lagoon beach.

*Distribution*: Widely distributed on the coasts of Atlantic and Indian Oceans.

30. Desmodora cinctum (Cobb)

*Material examined*: 1 ex., Amini, 28.1.87; 2 ex., Kadmat, 29.1.87.

*Diagnostic features*: Cuticle deeply ringed excepting the anterior head region. Lips indistinct. Longitudinal rows of cephalic and cervical setae 0.15–0.20 head diameter long. Amphid small, distinct, 1-spiral, located anteriorly on head and 0.12 head diameter wide. Oesophagus with a posterior bulb. Spicule in male curved and 0.9 anal diameter long. Gubernaculum is short and plate-like. Tail short and conical. Numerous subventral
preanal pricks present. Two preanal papillae occur about 80 and 150 μm, respectively from anus.

**Measurements** : Length 1.8–2.0 mm. Tail 1.5 anal diameters long.

**Remarks** : The disposition of cephalic and cervical setae, amphid and the preanal pricks are characteristic of the species. The Lakshadweep specimens agree well with the description and figures of the species given by Gerlach (1963) from Maldives. This is the first record of the species from Indian coast.

**Habitat** : Fine detritus coralline sand from algal thalli in the littoral zone of lagoon.

**Distribution** : Widely distributed on the coasts of Atlantic and Indian Oceans.

31. *Desmodora conocephala* Steiner 1918

**Material examined** : 3 ex., Minicoy, 12.3.83; 1 ex., Minicoy, 14.3.83.

**Diagnostic features** : Cuticle deeply annulated and interrupted with longitudinal ridges. Head nearly conical, with cuticular plates. Labial setae much reduced. Cephalic setae short and 0.3 head diameter long. Amphid distinct, a circular loop and about 0.4 head diameter wide. Tail conical-cylindrical. Spicule in male curved and 50 μm or 2.5 anal diameters long with 2 curved distal edges. Accessory plate short and sheath-like. Small sub-ventral setae occur around anus.

**Measurements** : Length 0.9–1.0 mm. Tail 6.0–6.5 anal diameters long.

**Remarks** : The species is clearly distinguished from other members of genus by the structure of the male genital apparatus, the long spicule and the short accessory plate being provided with curved edges at the distal part. This is the first record of the species from Indian coast.

**Habitat** : Fine coralline sediment rich in detritus from algal thalli near low water level, lagoon beach.

**Distribution** : Coasts of Atlantic and Indian Oceans.

32. *Monoposthia costata* (Bastian) 1865

**Material examined** : 2 ex., Kavaratti, 3.2.87.

**Diagnostic features** : Cuticular annules distinct and interrupted by 12 longitudinal rows of V-shaped crests. Buccal cavity deep and conical. One large dorsal tooth and two small subventral teeth present. Six labial and 6 cephalic papillae distinct. Cephalic setae 0.8 head diameter long. Amphid small, circular, occurs between third and fourth annules and 0.12 head diameter wide. Spicule obscure. Gubernaculum epsilon-like. Tail tapers posteriorly ending in a cone. One preanal and two postanal ventromedian papillae present.

**Measurements** : 1.6–1.8 mm. Tail 4.2 anal diameters long.

**Remarks** : The species has been studied and described in detail by several authors
with minor geographical variations. The present specimens, however, agree with the description and figures of the species given by Wieser (1959) from Puget Sound.

**Habitat**: Coarse and medium coralline sand 10 cm below surface between low and half-tide levels, intertidal zone, lagoon beach.

**Distribution**: Cosmopolitan.

### Genus **Rhinema** Cobb, 1920.

33. **Rhinema retrosum** Cobb.


**Material examined**: 3 ex., Kavaratti, 20.3.83.

**Diagnostic features**:
- Cuticle with 12 rows of longitudinal plates connected by V-shaped markings.
- Lips distinct with short labial setae. Four cephalic setae occur at the base of lips and 0.5 head diameter long. Amphid distinct, circular, 0.4 head diameter wide and occurs just behind the cephalic setae. Oesophageal bulb double at the posterior end of pharynx and divided into four sections. Tail conical and ends in a finger-like tip.
- Spicule in male 1.5 anal diameters long, with the distal part expanded. Gubernaculum epsilon-like. Anal papillae indistinct. Ovary paired.

**Measurements**: Length 0.8–1.0 mm. Tail 3.5 anal diameters long.

**Remarks**: The material examined corresponds well with the description and figures of the species given by Gerlach (1963) from Maldives. This is the first record of the species from Indian coast.

**Habitat**: Medium coralline sand with little detritus near low water level, lagoon beach.

**Distribution**: Coasts of Atlantic and Indian Oceans.

### Family **Epsilonematidae**

### Genus **Metepsilonema** Steiner, 1927

34. **Metepsilonema** sp.

**Material examined**: 3 ex., Konarak, 24.1.77.

**Diagnostic features**:

**Measurements**: Length 0.38–0.42 mm. Tail 2.2 anal diameters long.

**Remarks**: The specimens examined differ from the known species of the genus in the presence of ventral adhesive tubes and the relative dimensions of the body. Specific identification of the material needs further study.

**Habitat**: Coarse and medium coralline sand with little detritus and fine shell gravel between low and half-tide levels, intertidal zone, lagoon beach.
Genus *Eubostrichus* Greeff, 1869

35. *Eubostrichus exilis* (Cobb)


*Material examined*: 2 ex., Minicoy, 15.3.83; 2 ex., Agatti, 8.2.87; 1 ex., Bangaram, 10.2.87.

*Diagnostic features*: Cuticle finely striated. Lips indistinct. Labial papillae present. Four cephalic setae 0.8 head diameter long. Numerous cervical and somatic setae are short and reach 1/3 of cephalic setae. Amphid conspicuous, 1.5 spiral, located on the anterior border of head and 0.4 head diameter wide. Tail conical. Spicule in male 1.2 anal diameters long, with distal part expanded into a bulb. Gubernaculum tapers distally to a point. Ten pairs of sub-ventral papillae occur on tail. Midventral preanal and postanal pricks present.

*Measurements*: Length 3.0–3.5 mm. Tail 1.5–1.7 anal diameters long.

*Remarks*: The specimens examined conformed well with the description and figures of the species given by Gerlach (1963), particularly in the structure of the amphid, genital apparatus and caudal papillae. This is the first record of the species from Lakshadweep.

*Habitat*: Coarse and medium coralline sand with fine shell gravel and little detritus near low water level, lagoon beach.

*Distribution*: Widely distributed along the coasts of Atlantic and Indian Oceans.

Family **MONHYSTERIDAE**

Genus *Monhystera* Bastian, 1865

36. *Monhystera parva* (Bastian)


*Material examined*: 2 ex., Kadmat, 30.1.87; 1 ex., Amini, 27.2.83.


*Measurements*: Length 1.6–1.8 mm. Tail 5.6–5.8 anal diameters long.

*Remarks*: The specimens agree well with the description and figures of the species given by the previous workers except for the longer body. This is the first record of the species from Lakshadweep.

*Habitat*: Coarse and medium coralline sands with fine shell gravel and little detritus between low and half-tide levels, intertidal zone.

*Distribution*: Cosmopolitan.
Genus **Theristus** Bastian, 1865

37. **Theristus setifer** Gerlach


*Material examined:* 3 ex., Agatti, 8.2.87; 1 ex., Agatti, 9.2.87.

*Diagnostic features:* Cuticle finely striated. Lips prominent. Cephalic setae 1.0 head diameter long. Cervical and somatic setae are 2.5–3.0 head diameters long. Amphid distinct, circular, 0.3 head diameter wide and located just behind cervical setae. Spicule in male bent at right angle, with the proximal and distal part slightly expanded and reaches 25 μm or 1.0 anal diameter long. Gubernaculum short and sheath-like. Tail conical-cylindrical, with two long terminal setae.

*Measurements:* Length 0.8 mm. Tail 6.5 anal diameters long.

*Remarks:* The species is readily distinguished by the elongate structure and disposition of setae on head and tail. This is the first record of the species from Indian Coast.

*Habitat:* Coarse coralline sand with little detritus 10 cm below surface between low and half tide levels, intertidal zone.

*Distribution:* Mediterranean Sea, Red Sea, Lakshadweep.

Genus **Rhynchonema** Cobb, 1920

38. **Rhynchonema cinctum** Cobb


*Material examined:* 1 ex., Minicoy, 14.3.83; 2 ex., Kavaratti, 20.3.83.


*Measurements:* Length 0.80–0.85 mm. Tail 4.0–4.6 anal diameters long.

*Remarks:* The specimens agree well with the original description of the type species, but for minor variations in the Demanian values.

*Habitat:* Coarse and medium coralline sand with little detritus 5-10 cm below surface between low and half-tide levels, intertidal zone.

*Distribution:* Eurytopic along the coasts of Pacific, Atlantic and Indian Oceans.

Family **CAMACOLAIMIDAE**

Genus **Procamacolaimus** Gerlach, 1953

39. **Procamacolaimus tubifer** Gerlach


*Material examined:* 4 ex., Kavaratti, 3.2.87.
Diagnostic features: Cuticle deeply annulated with rings 1.6 μm wide. Cephalic setae slightly less than 1.0 head diameter long. Amphid circular, loop-like, about 0.5 head diameter wide and situated anteriorly at the level of cephalic setae. Buccal cavity funnel-like. Tail conical-cylindrical, with pointed tip. Spicule in male 30 μm or about 1.5 anal diameters long. Six preanal papillae 10 μm long are evenly spaced on the ventral side. A button-like ventromedian papilla present about half-way on the tail.

Measurements: Length 0.8 mm. Tail 4.5 anal diameters long.

Remarks: The specimens correspond well with the description and figures of the species made from Madagascar and Maldives (Gerlach, 1962).

Habitat: Medium coralline sand with little detritus near mid-water level, intertidal zone.

Distribution: Madagascar, Maldives, Lakshadweep, India.

Genus Camacolaimus De Man, 1889

40. Camacolaimus prytherchi Chitwood


Material examined: 3 ex., Minicoy, 11.3.87; 2 ex., Minicoy, 13.3.87.

Diagnostic features: Cuticle deeply annulated. Cephalic setae 0.4 head diameter long. Amphid circular, loop-like, 0.4 head diameter wide and situated anteriorly at the level of cephalic setae. Buccal cavity spacious and elongated. Tail conical-cylindrical with a pointed tip. Spicule in male 40 μm or 1.6 anal diameters long. Preanal papillae absent on the ventral side of tail. Gubernaculum sheath-like, 0.5 anal diameter long and distally curved posteriorly to a point.

Measurements: Length 1.2-1.4 mm. Tail 3.0 anal diameters long.

Remarks: The specimens examined agreed well with the description of the species made by Gerlach (1962) from Maldives. This is the first record of the species from Lakshadweep.

Habitat: Coarse coralline sand rich in organic detritus 5 cm below surface near low water level, lagoon beach.

Distribution: Widely distributed on the coasts of Atlantic, Pacific and Indian Oceans.

Family TRIPYLOIDIDAE

Genus Bathylaimus Cobb, 1893

41. Bathylaimus depressus Gerlach


Material examined: 1 ex., Minicoy, 13.3.83; 1 ex., Minicoy, 15.3.83.

Diagnostic features: Body cylindrical. Lips and labial setae prominent. Ten cephalic setae are 0.6 head diameter long. Cephalic setae modified with expanded and jointed tips, 1.0 head diameter long. Buccal cavity spacious and cuticularised. Pharynx highly muscular. Amphid distinct horse-shoe shaped with closely set loops and reaches 0.4–0.6 head diameter wide. Tail short and conical-cylindrical, with a distinct spinnert at the tip. Spicule in male 1.0 anal diameter long.
**Measurements**: Length 1.2 mm long. Tail 2.5 anal diameters long.

**Remarks**: The species is readily distinguished from other members of the genus in the structure of cephalic setae with expanded tips and the closely knit arms of the amphid. This is the first record of the species from Indian coast.

**Habitat**: Coarse coralline sand with little detritus 10 cm below surface near low water level, lagoon beach.

**Distribution**: Maldives, Lakshadweep.

Genus *Cytolaimium* Cobb, 1920

42. *Cytolaimium exile* Cobb


**Material examined**: 5 ex., Kalpeni, 13.2.87.

**Diagnostic features**: Lips prominent. Labial setae short and jointed. Cephalic setae large, 1.3 head diameters long and 3-jointed. Amphid conspicuous, ring-like and 0.4 head diameter wide. Amphid larger in male than in female. Buccal cavity funnel-like. Tail conical-cylindrical, with a chitinous cap at the end. Spicule in male is bent at right angle and 1.0 anal diameter long. Accessory plate short, sheath-like and distinct. Fourteen to 20 button-like preanal and postanal papillae occur on the ventromedian surface of tail.

**Measurements**: Length 2.4–3.0 mm. Tail 5.0 anal diameters long.

**Remarks**: The species is readily distinguished from other members of the genus by the jointed structure of cephalic setae and the presence of preanal and postanal papillae. This is the first record of the species from Indian waters.

**Habitat**: Coarse coralline sand with little detritus between low and mid water levels, lagoon beach.

**Distribution**: Coasts of Atlantic and Indian Oceans.

Phylum GASTROTRICHA

Order MACRODASYIDA

Family MACRODASYIDAE

Genus Macrodasys Remane, 1924

43. *Macrodasys indica* n. sp.

(Fig. 1)

**Material examined**: 4 ex., Minicoy, 15.3.83; 1 ex., Minicoy, 16.3.83.

**Description**: Adult specimens attain a maximum length of 0.85 mm including the tail. Maximum width of the body attains 0.12 mm about half the length from anterior end. Body is transparent and dorsoventrally flattened. The anterior end is bluntly rounded without any projections, while the posterior end tapers into a pointed tail 0.15 mm in length. Head is not delineated from trunk and bears a pair of lateral pestle organs. Epidermis is finely granular with several rows of dorsolateral epidermal glands 3-5 μm in diameter. Fine cilia 10-20 μm long occur along the anterior border of head and lateral margins of the trunk. Ciliation forms a continuous field on the ventral surface.
Fig. 1. *Macrodasyis indica* n. sp.
A. Adult, ventral view; B. Anterior region, ventral view; C. Penis; D. Bursa copulatrix.
Adhesive tubes occur in anterior, lateral and posterior series. The anterior tubes are about 10 μm long and occur in two groups of 2+6 on either side in an arc on the ventral surface of head just behind the mouth. Eight pairs of lateral tubes occur beginning about the posterior end of pharynx. They are even in disposition and reach about 15 μm in length. Six pairs of posterior tubes occur on the lateral surface of tail and are distinctly separated from the lateral tubes of the trunk. They reach 6-12 μm in length, their size decreasing steadily to the posterior end.

The mouth is terminal, cup-shaped and the oral cavity has a velum characteristic of the genus. The pharynx is about 260 μm long and occupies nearly 2/5 of the total gut length. The pharyngeal pores are distinct and lie about 3/5 of the pharynx from anterior end. The gut following the pharynx is undifferentiated and tapers to the posterior end. Anus is subterminal and opens on the ventral surface about 30 μm from the base of tail.

The reproductive organs consist of a paired testis located laterally along anterior region of the intestine. Vasa deferentia terminate close to the penis. The penis is pitcher-shaped, about 80 μm long, located posterior to the ovary and opens anteriorly on the ventral body surface. Mature specimens were observed to carry 3-5 egg cells having a maximum diameter of 90 μm. Bursa copulatrix is about 200 μm long, with conspicuous muscular and vermiform portions. The bursa opens posteriorly into a distinct antrum feminum.

Remarks: The species of the genus Macrodasys Remane are distinguished mainly based on the structure of the genital organs. Among the known species of the genus, in the structure of penis and bursa, M. indica n. sp. shows close relationship with M. africanus Remane, 1950 described from the south-west coast of Africa. But, the new species clearly differs from the latter in the presence of an antrum, larger body size, lower number of lateral and posterior adhesive tubes and the presence of a distinct tail.

The genus Macrodasys was initially characterised by the presence of pharyngeal pores in the mid-pharyngeal region and a short tail. But subsequently some species were described with the pharyngeal pores close to the posterior end of pharynx, while others were described without a mention of pharyngeal pores. Hence, the generic diagnosis based on the position of the pharyngeal pores needs to be mended.

Diagnostic features: Body upto 0.90 mm long, 0.12 mm wide, transparent and dorsoventrally flattened. Anterior end bluntly rounded. Posterior end tapers to a distinct tail. Eight pairs of anterior tubes occur in an arc of 2+6 on either side of the mouth. Eight pairs of lateral and six pairs of posterior tubes present. Pharynx occupies 2/5 of gut length. Pharyngeal pores occur posterior to the mid-pharyngeal region. Bursa copulatrix very long with two distinct portions. Antrum feminum present.

Holotype: Specimen 0.8 mm long, with ova and sperm collected by the author on 15.3.83. Deposited in the National Zoological Collections, Z.S.I., Calcutta. Regd. No. P.799/1.

Type locality: Coarse and medium coralline sands 5 cm below surface between low and half-tide levels, intertidal zone, Minicoy (Lat. 08°17'N and Long 73°04'E), Lakshadweep, India.

Genus Urodasys Remane, 1926

44. Urodasys viviparus Wilke

Material examined: 1 ex., Agatti, 7.2.87; 1 ex., Bangaram, 10.2.87.


Measurements: Length 0.35 mm and width 0.05 mm. Tail reaches 0.9 mm in length.

Remarks: The specimens examined agree well with the description and figures of the type species from Mediterranean Sea (Wilke, 1954) and Maldives (Gerlach, 1961).

Habitat: Coarse coralline sand with fine shell gravel and little detritus between low and half-tide levels, intertidal zone.

Distribution: Eurytopic on the coasts of Atlantic and Indian Oceans.

Family THAUMASTODERMATIDAE
Genus Acanthodasys Remane, 1927

45. Acanthodasys aculeatus Remane, 1927.

Material examined: 2 ex., Kavaratti, 7.3.83; 1 ex., Kavaratti, 20.2.83.


Measurements: Length 0.5-0.6 mm and width 0.06 mm.

Remarks: The specimens from Lakshadweep conform well with the original description of the species except for minor variations in the number and disposition of adhesive tubes, particularly the dorsolateral ones.

Habitat: Medium and coarse coralline sand with little detritus between low and half-tide levels, intertidal zone.

Distribution: Eurytopic on the coasts of Atlantic and Indian Oceans.

Genus Thaumastoderma Remane, 1926

46. Thaumastoderma heideri Remane, 1926

Material examined: 2 ex., Kavaratti, 6.3.83; 1 ex., Minicoy, 15.3.83.

Diagnostic features: Body elongate and dorsoventrally flattened. Head with 2 pairs of laterally directed tentacles. Dermal hooks 4-pronged. Five pairs of anterior, 20 pairs of lateral and 6 pairs of posterior tubes present. Two pairs of reddish eye spots on head.
are characteristic of the species. Five pairs of long dorsolateral cirri present. Ventral ciliation uniform. Pharyngeal pores located at the posterior end of phrynx. Single testis lies on the right side lateral to the anterior part of intestine. Copulatory bursa and seminal receptacle present.

**Measurements**: Length 0.25 mm and maximum width 0.05 mm.

**Remarks**: Although the material examined corresponds well with the original description of the species from Baltic Sea, the disposition of tentacles and adhesive tubes resemble more the specimens of the species reported by Gerlach (1961) from Maldives.

**Habitat**: Medium and coarse coralline sand with little detritus 5-10 cm below surface near half-tide level, intertidal zone.

**Distribution**: Eurytopic along the coasts of Atlantic and Indian Oceans.

**Genus Tetranchyroderma Remane, 1926**


**Material examined**: 1 ex., Kavaratti, 18.2.83; 2 ex., Androth, 24.2.83.

**Diagnostic features**: Body elongated and dorsoventrally flattened, with both the ends rounded. Cuticular armament of tetrancres in 10-12 longitudinal rows. A pair of cephalic tentacles and 4 pairs of dorsolateral cirri present. Five pairs of anterior, 20-30 pairs of lateral and 16-20 posterior adhesive tubes present. Posterior pedicles absent. Five to 7 pairs of dorsolateral epidermal glands present. Ventral ciliation uniform and complete. Pharynx is 110 μm long and occupies about 1/3 of the total gut length. A single tubular testis present on the right side.

**Measurements**: Length 0.3 mm and width 0.06 mm.

**Remarks**: The specimens examined agree well with the original description except for the larger number of lateral and posterior adhesive tubes in the local forms.

**Habitat**: Medium coralline sand 10 cm below surface near half-tide level, intertidal zone.

**Distribution**: Andhra and Orissa coasts, Andaman Islands, Lakshadweep.

48. *Tetranchyroderma paralittoralis* n. sp.

(Fig. 2)

**Material examined**: 11 ex., Androth, 26.2.83; 3 ex., Androth, 27.2.83.

**Description**: The specimens attain a maximum length of 380 μm and a width of 50 μm in extended condition. Body is about 7 times longer than width, vermiform and dorsoventrally flattened. The animal is highly contractile and its shape in the free moving condition looks as shown in figure. Head distinct with a narrow neck and the trunk nearly keeps the same width all along its length. Both the head and tail are bluntly rounded. Head is of the same width as trunk and bears a pair of lateral pestle organs. Tentacles absent. Posterior end of the body bears two pedicles commonly seen in other species of the genus.

Excepting for the anterior region of head, body has a complete dorsal covering of cuticular hooks arranged in about 110 transverse rows. Each row consists of 9-12 hooks.
Fig. 2. *Tetranchyroderma paralittoralis* n. sp.
A. Adult, dorsal view; B. Adult, ventral view; C. Tetrancre; D. Pentancre; E. Posterior pedicle, dorsal view.
The anterior 25-40 rows are composed of tetrancres or 4-pronged hooks, while the rest of the posterior ones are pentancres or 5-pronged hooks. All the hooks have prongs of equal size and measure about 2-3 \( \mu m \) in the anterior region and 3-5 \( \mu m \) in the posterior region. There are 8-10 pairs of dorsolateral epidermal glands with regringent granular material. The glands are about 6-8 \( \mu m \) in diameter. Short sensory cilia 6-12 \( \mu m \) long occur on the anterior margin of head and the lateral margins of the trunk. Ciliation on the ventral surface is median extending from the anterior end to the posterior end.

All the four series of adhesive tubes known in the genus are present. The anterior adhesive organ consists of 3 pairs of tubes about 8 \( \mu m \) in length on the ventral surface just behind the mouth. Twelve pairs of evenly spaced ventrolateral tubes measuring 8-10 \( \mu m \) in length are present. The tubes start from the level of the neck region and extend posterior to the level of anus. The posterior adhesive pedicles are trifid with one ventral and two dorsal tubes. Between the two pedicles on the inner side occurs a pair of posteriorly directed tubes. All the tubes are equal in length and reach about 8 \( \mu m \) in length. In addition, 3 pairs of posterior ventral tubes about 8 \( \mu m \) in length are present close to the level of anus.

Anteriorly, the mouth is widely extensible, about 40 \( \mu m \) wide and inclined slightly to the ventral surface. Pharynx is about 120 \( \mu m \) long and occupies nearly 1/3 of the total gut length. Pharyngeal pores are indistinct at the posterior end of pharynx. Anus is subterminal. Reproductive system follows the usual pattern typical of the genus with a single testis and a ovary. The linear testis located on the right side extends upto half the length of the body. One dorsal ovum about 60 \( \mu m \) in maximum diameter was observed in the last 1/3 part of the body. Receptaculum seminis is small, 15 \( \mu m \) long and bladder-like. Bursa corpulatrix lies behind the receptaculum, 30 \( \mu m \) long, pitcher-shaped and opens on the ventral surface just behind the male genital aperture and before the anal aperture.

Remarks: The genus \textit{Tetranchyroderma} Remane is characterised by the presence of several rows of anchor-like cuticular hooks on the dorsal surface. All the known species fall within 3 groups, viz., species having three or four or five-pronged hooks called the triancres, tetrancres and pentancres, respectively. But, there are only a very few species having two varieties of these hooks. Thus, among the known species, \textit{T paralilloralis} n. sp. closely approaches \textit{T paradoxa} Fenchel, 1970 described from the South Florida beaches in the dorsal tetrancres and pentancres, number of adhesive tubes, dermal glands, etc. But the new species is clearly distinguished from the latter in the absence of dorsal head tentacles, disposition of dermal hooks and anterior tubes and the presence of posterior ventral tubes. In \textit{T paradoxa}, the tentacres and pentancres alternate in their disposition.

Diagnostic features: Body upto 380 \( \mu m \) long and about 7 times longer than wide. Head tentacles absent. Dorsal body surface covered with about 90-110 transverse rows of cuticular hooks. First 25-40 rows are tetrancres and the rest are pentancres. Eight to 10 pairs of dorsolateral epidermal glands present. Adhesive organs comprise 3 pairs of anterior, 12 pairs of ventrolateral and 3 pairs of posteroverntral tubes. Posterior pedicles have 3 pairs of terminal tubes and 1 pair of inner tubes. Seminal receptacle bladder-like and copulatory bursa pitcher-shaped.

Holotype: Adult specimen 370 \( \mu m \) long with gonads collected by the author on 26.3.83. Deposited in the National Zoological Collections, Z.S.I., Calcutta. Regd. No. P.800/1.
**Type locality**: Coarse and clean coralline sand 10 cm below surface near half tide level, intertidal zone, Androth (Lat. 10°49'N and Long. 73°41'E), Lakshadweep, India.

**Genus** *Pseudostomella* Swedmark, 1956


*Material examined*: 2 ex., Agatti, 8.2.87.

*Diagnostic features*: Body dorsoventrally flattened, width-length ratio is about 1 : 4. Cuticular armament of tetrancres in 11-13 longitudinal rows. Cephalic net with 5 dorsal and 8 ventral papillae. Two pairs of anterior, 24 pairs of lateral and 3 pairs of ventrolateral tubes present. Two pairs of additional tubes occur between posterior pedicles. Three pairs of dorsolateral epidermal glands present. Pharynx occupies 2/5 of the total gut length. Pharyngeal pores occur close to the posterior end of pharynx. Testis unpaired. Seminal receptacle and bursa copulatrix present. Single dorsal ovary occurs opposite to testis.

*Measurements*: Length 0.2 mm and maximum width 0.05 mm.

*Remarks*: The specimens conform well with original description of the species except for the larger size of the body.

*Habitat*: Medium coralline sand 10 cm below surface near mid-water level, intertidal zone, lagoon beach.

*Distribution*: Andhra and Orissa coasts, Lakshadweep.

Family **Dactylopodolidae**


*Material examined*: 2 ex., Agatti, 6.2.87; 1 ex., Bangaram, 10.2.87.

*Diagnostic features*: Head distinct and simple, with neck constriction. Pestle organs and cuticular armament absent. Four groups of sensory cilia occur laterally on head. Posterior end bilobed, each lobe with 4 adhesive tubes of unequal length. Two pairs of anterior and 5 pairs of lateral adhesive tubes occur implanted on mobile protuberances of cuticle. Pharynx short and occupies one-fourth of the total gut length. Pharyngeal pores occur at the level of neck constriction. Testes, ovary, receptaculum seminis and bursa copulatrix present. Body transparent and contractile. Trunk bears several lateral sensory hairs. Ventral ciliation imperfect.

*Measurements*: Length 0.35 mm and width 0.06 mm.

*Remarks*: The specimens agree well with the original description of the species from Waltair coast.

*Habitat*: Medium sand 10 cm below surface near mid-water level.

*Distribution*: Andhra and Orissa coasts, Andaman Islands, Lakshadweep.

Family **Turbanellidae**

Genus *Turbanella* Schultze, 1853
51. *Turbanella aminensis* n. sp.  
(Fig. 3)  

**Material examined**: 7 ex., Amini, 27.2.83; 2 ex., Kadmat, 30.1.87.

**Description**: Adult specimens attain a length up to 550 μm including caudal lobes and a maximum width of 70 μm. Body is elongated, strap-shaped, widest in the middle region and slightly tapers towards the posterior end. Head is 60 μm in maximum width, not clearly demarcated from trunk, rounded anteriorly and bears no lateral appendages. Posterior end is deeply cleft and bilobed. The caudal lobes are short, triangular and reach about 25 μm in length. A median caudal cone is absent between the two caudal lobes.

Cuticle is thin and transparent without any dorsal armament as scales, spines, papillae, etc. About 12 pairs of dorsolateral epidermal glands present. The glands are well developed and measure 10 μm in maximum diameter. A circumcephalic ring of cilia measuring 10-12 μm in length occur on the head. Anteriorly, the head bears short sensory cilia 6-8 μm long. Twelve plus 9 pairs of laterally directed sensory bristles occur inserted anteriorly to the lateral and dorsolateral adhesive tubes. Ventral ciliation occurs in two lateral longitudinal patches behind the anterior ventral adhesive feet, while a median patch starts from the circumcephalic ciliary girdle to the middle part of the body.

Adhesive tubes occur in anterior, ventrolateral, dorsolateral and posterior series. Five pairs of anterior tubes 6-8 μm long occur on well developed and extensible ventrolateral feet located behind the circumcephalcal ciliary girdle. Twelve pairs of ventrolateral tubes measuring about 10 μm in length are present. The tubes do not carry any sensory hairs at their tips as seen in some other species of the genus. The tubes are evenly spaced with a fair bilateral symmetry and start from a level about half the length of pharynx. Nine pairs of dorsolateral tubes 8 μm in length occur in a bilateral symmetry behind the circumcephalcal ciliary girdle. The tubes also lack sensitive bristles at their tips. Six posterior tubes occur on the inner edge of each caudal lobe. The tubes are 6-12 μm long and their length progressively increases to the outside. The outer edge of the caudal lobe, however, carries no adhesive tubes.

The mouth is terminal, 20 μm wide, slightly inclined to the ventral surface and encircled by a corona of short sensory setae 3-4 μm long. Buccal cavity is small and conical. Pharynx is about 150 μm long and occupies slightly less than 1/3 of the total gut length. Pharyngeal pores are conspicuous at the posterior end of pharynx. Intestine is about 330 μm long and narrows progressively to the posterior end. Anus is subterminal and opens on the ventral surface in front of the caudal lobes about 20 μm from the posterior border.

Reproductive system follows the usual pattern characteristic of the genus. Paired testis extends lateral to the anterior part of the intestine, with the vasa deferentia bending in the region of egg cells. Male genital pore is indistinct. Two dorsal eggs are observed in a mature specimen measuring about 65 μm in maximum diameter.

**Remarks**: Among the known species of the genus *Turbanella* Schultze, which bear neither lateral cephalic lobes nor mediocaudal cones, *T. aminensis* n. sp. closely approaches *T. palaciosi* Remane, 1953 described from the pacific coast in the shape of the body and the number and disposition of adhesive tubes. But, the new species clearly differs from the latter in having a small buccal cavity, well developed ventral feet, dorsolateral tubes extending up to the pharyngeal region and the lateral adhesive tubes.
Fig. 3. *Turbanella aminensis* n. sp.
A. Adult, dorsal view; B. Adult, ventral view; C. Anterior adhesive foot; D. Posterior caudal lobe.
lacking sensory bristles at their tips.

**Diagnostic features**: Body up to 550 μm in length and 70 μm in width. Head indistinct and bears a circumcephalic ciliary girdle. Cephalic appendages absent. Posterior end bilobed and deeply cleft. Caudal lobes short and triangular. Median anal cone absent. Adhesive organs consist of 5 pairs of anterior tubes implanted on mobile ventral feet, 12 pairs of ventrolateral tubes, 9 pairs of dorsolateral tubes and six pairs of posterior tubes on caudal lobes. About 12 pairs of dorsolateral epidermal glands present. Ventral ciliation in $2^{1/2}$ longitudinal bands. Pharynx occupies less than $1/3$ of the total gut length. Pharyngeal pores conspicuous at the posterior end of pharynx.


**Type locality**: Medium coralline sand with little detritus 10 cm below surface between low and half-tide levels, intertidal zone, Amini (Lat. 11°07'N and Long. 72°44'E), Lakshadweep, India.

**Genus Paraturbanella Remane, 1927**

52. *Paraturbanella brevicaudatus* n. sp. (Fig. 4)

**Material examined**: 3 ex., Kavaratti, 17.2.83; 9 ex., Kavaratti, 19.2.83.

**Description**: Adult specimens reach a length of 660 μm including caudal lobes and a maximum width of 85 μm. Body dorsoventrally flattened, ribbon-like, widest in the middle and tapers moderately towards the posterior end. Head is distinct, demarcated from the rest of the body by a narrow neck and measures about 70 μm at its widest part. The head is somewhat triangular in outline with a blunt anterior end and bears laterally two piston pits. Posterior end of the animal is cleft into two short, round caudal lobes about 8 μm in length. Between the two caudal lobes occurs a median anal cone about 6 μm in length.

The cuticle is smooth, thin and transparent. Eight to ten pairs of dorsolateral epidermal glands 6 μm in maximum diameter occur extending between the head and the tail. the ventral ciliation occurs in two lateral longitudinal bands. Sensory bristles 10-15 μm long occur sparsely on the anterior border of head and the lateral margins of the trunk.

The anterior adhesive organ consists of two groups of tubes implanted on well developed mobile protuberances of the cuticle. Each group consists of 6 tubes of equal length measuring about 8 μm and directed anteriorly. The lateral adhesive tubes are much reduced. They are represented by a pair of posteriorly directed ventrolateral feet located behind the anterior feet and about the mid-pharyngeal region. Each foot bears two tubes of unequal length, measuring about 30 μm and 20 μm, respectively. Each caudal lobe supports 5 posterior adhesive tubes, the outer ones being longer than the inner ones. The tubes measure 10-15 μm in length.

The mouth is 15 μm wide and terminal. The buccal cavity is spacious and cylindrical with a lining of thick cuticularised walls. The cavity measures 30 x 24 μm in size. The pharynx is about 210 μm long and occupies nearly $1/3$ of the total gut length. The
Paraturbanella brevicaudatus n. sp.
A. Adult, dorsal view; B. Anterior region, ventral view; C. Lateral adhesive tubes; D. Posterior region, ventral view.
pharyngeal pores are conspicuous and situated close to the posterior end of pharynx. The
gut following pharynx progressively narrows to the posterior end. Anus is subterminal
and opens on the ventral surface about 20 μm from the posterior border.

The reproductive system follows the pattern typical of the genus. The paired testis
and ovary are situated lateral to the intestine. Two or 3 egg cells were observed in
mature specimens, measuring about 55 μm in maximum diameter.

Remarks : The genus Paraturbanella Remane is mainly characterised by
the presence of posteriorly directed ventrolateral feet implanted on mobile protuberances
of the cuticle in the pharyngeal region, each foot comprising 2 adhesive tubes of unequal
length. The spacious and cylindrical buccal cavity is also considered an important
diagnostic feature of the genus. Among the known species of the genus bearing no
lateral adhesive tubes, P. brevicaudatus n. sp. closely approaches the type species P.
dohrni Remane 1927 in the structure of the body, particularly the disposition of adhesive
tubes. But, the new species clearly differs from the latter in the number of anterior and
posterior adhesive tubes. P. brevicaudatus is distinguished from all the known species
of the genus in having short and reduced caudal lobes, based on which character the new
specific name has been coined.

Diagnostic features : Body up to 660 μm long and 85 μm in maximum width.
Head distinct. Lateral cephalic lobes absent. Piston pits present. Eight to 10 pairs of
dorsolateral epidermal glands present. Ventral ciliation occurs in two lateral longitudinal
bands. Caudal lobes reduced, short and round. A median anal cone occurs between the
two caudal lobes. Six pairs of anterior tubes, 2 pairs of ventrolateral tubes and 5 pairs of
posterior tubes present. Buccal cavity spacious and heavily cuticularised. Pharynx forms
1/3 of the total gut length. Pharyngeal pores occur at the posterior end of pharynx.
Gonads paired.

Holotype : Specimen 650 μm long, with ova and sperm, collected by the author on
No. P 802/1.

Type locality : Coarse and medium coralline sand 10 cm below surface between
low and mid-water levels, intertidal zone, Kavaratti (Lat. 10°33'N and Long. 72°38'E),
Lakshadweep, India.

Order CHAETONOTIDA
Family XENOTRICHULIDAE
Genus Xenotrichula Remane, 1927 STOPPED

53. Xenotrichula velox Remane


Material examined : 2 ex., Kavaratti, 18.2.83; 2 ex., Androth, 23.2.83; 1 ex.,
Kadmat, 26.1.87.

Diagnostic features : Body dorsoventrally flattened and covered with pedunculated
scales in about 16 longitudinal rows. Head with two lateral tentacles 20 μm long
directed backwards and 2 pairs of long sensory bristles directed forwards. Two caudal
furca with adhesive tubes. Locomotory ventral cirri of one size occur in two longitudinal
rows on either side of the digestive tract. Pharynx forms 1/3 of the total gut length.
Pharyngeal pores inconspicuous. Hermaphroditic with developed testis and ovary.
**Measurements**: Length 0.25 mm and width 0.06 mm.

**Remarks**: The specimens agree well with the original description of the species except for minor variations in the length of the body parts and the number of the rows of dorsal dermal scales.

**Habitat**: Coarse and medium coralline sands 10 cm below surface between low and high water levels, intertidal zone.

**Distribution**: Baltic Sea, Mediterranean, Atlantic and Indian Oceans.

54. *Xenotrichula laccadivensis* n. sp.

**(Fig. 5)**

**Material examined**: 2 ex., Kavaratti, 17.2.83; 7 ex., Kavaratti, 19.2.83.

**Description**: Adult specimens of this species attain a length of 170-220 \( \mu \text{m} \) excluding the tail forks and a maximum width of 60-70 \( \mu \text{m} \). The body has a typical chaetonotoid appearance, with a distinct head, neck, trunk and caudal forks. The head is crescent-shaped on the anterior border. It bears two pairs of sensory bristles 20-25 \( \mu \text{m} \) long on the anterior margin and a pair of posteriorly directed tentacles measuring 20-25 \( \mu \text{m} \) long. Two pairs of dorso-lateral sensory cirri measuring about 10 \( \mu \text{m} \) long occur in the neck region. The tail forks are slender, slightly taper posteriorly and reach 30-35 \( \mu \text{m} \) in length. Each tail fork carries an adhesive tube 15 \( \mu \text{m} \) long. The caudal glands located in the tail forks lateral to the anal opening are well developed and the animal exhibits great powers of adhesion to sand grains.

Cuticular armature on the dorsal surface of the body is of simple and appressed scales arranged in several longitudinal rows, their number varying considerably on head, neck, trunk and tail forks. Dorsally 8 rows of scales occur on head, 6 rows on neck, 12 rows on trunk and 2-3 rows on tail forks. The mid-dorsal longitudinal row consists of about 35 scales. The scales are poorly developed on anterior, posterior and ventrolateral extremities. Pedunculated scales occur laterally on trunk. The scales are borne on 1-2 \( \mu \text{m} \) long preduncles. Ventral hypotrichous cirri of the same size characteristic of the family occur in two longitudinal rows, one on either side of the digestive tract. Each row consists of about 27 cirri 10-12 \( \mu \text{m} \) long arranged in 3 groups of 18+6+3 along the pharynx, mid and posterior gut regions, respectively.

The mouth is terminal, circular, 8 \( \mu \text{m} \) wide and inclined to the ventral surface. The oral cavity is ridged and 2.5 \( \mu \text{m} \) in length. The pharynx is about 65 \( \mu \text{m} \) long and occupies about 1/3 of the total gut length. The gut following pharynx is about 130 \( \mu \text{m} \) long and undifferentiated into a stomach and intestine. Anus is subterminal and opens on the ventral surface about 6 \( \mu \text{m} \) from posterior border.

Reproductive system consists of paired testis and ovary situated symmetrically on either side of the gut. The testes are club-shaped strands located posterior to the ova and vasa differentia open anteriorly behind the pharyngeal region. Mature eggs measure about 45 \( \mu \text{m} \) in maximum diameter.

**Remarks**: Among the known species of the genus *Xenotrichula* Remane, *X. laccadivensis* belongs to the group of gastrotrichs bearing cephalic tentacles. In the structure of the tentacles, dermal scales and the disposition of ventral cirri, the new species closely approaches *X. subterranea* Remane, 1934 described from the Baltic Sea.
Fig. 5. *Xenotrichula laccadivensis* n. sp.
A. Adult, dorsal view; B. Adult, ventral view.
coast. *X. laccadivensis* is, however, clearly distinguished from *X. subterranea* and other species of the genus in having 2 pairs of dorsolateral sensory cirri in the neck region.

**Diagnostic features**: Body typically chaetonotoid in appearance. Adult specimens 170-220 µm long excluding caudal furca and 60-70 µm in maximum width. Head bears 2 pairs of sensory bristles and a pair of posteriorly directed tentacles 20-25 µm long. Two pairs of dorsolateral sensory cirri about 10 µm long occur on neck region. Tail forks 30-35 µm long with adhesive tubes 15 µm long. Caudal glands well developed. Cuticular armature consists of 6-12 longitudinal rows of simple appressed scales. Pedunculated scales occur laterally on trunk. Mid-dorsal scales in a row comprise about 35. Locomotory ventral cirri occur in 3 paired groups of 18+6+3 disposed laterally along the digestive tract. Pharynx is about 65 µm long and occupies 1/3 of the total gut length. Gonads are paired and symmetrical on either side of the gut.


**Type locality**: Fine detritus sand 5 cm below surface near mid-water level, intertidal zone, Kavaratti (Lat. 10°33'N and Long. 72°38'E), Lakshadweep, India.

**Genus Chaetonotus Ehrenberg, 1830**

55. **Chaetonotus atrox Wilke**


**Material examined**: 1 ex., Kavaratti, 6.3.83; 2 ex., Minicoy, 11.3.83.

**Diagnostic features**: Body dorsoventrally flattened with distinct head, neck and trunk. Trunk widest in mid-body region. Paired tufts of sensory bristles occur on anterior margin of head. The species belongs to the *schultzei* group with 9-11 rows of scales with median and lateral spine 10-25 µm long. Caudal furca curved to the interior. The scales are horse-shoe shaped on anterior region of trunk and triangular on posterior region. Spines on scales in the mid-body region are the longest. Pharynx forms 1/3 of the total body length. Oral tube rigged. Anus subterminal on dorsal surface. Ventral ciliation in regular transverse bands. A single dorsal ovum present in mature specimens.

**Measurements**: Length 0.15 mm and maximum width 0.04 mm. Caudal furca 20 µm long.

**Remarks**: Although considerable variation has been reported in the disposition of dermal scales of this species from different geographical regions, the local specimens, however, closely approach the original description of the species given for the Mediterranean specimens.

**Habitat**: Fine and medium coralline sands between low and high water levels, intertidal zone.

**Distribution**: Eurytopic along the coasts of Atlantic and Indian Oceans.

56. **Chaetonotus triradiatus** n. sp.  
(Fig. 6)

**Material examined**: 9 ex., Agatti, 8.2.87; 4 ex., Agatti, 11.2.87; 2 ex., Agatti,
12.2.87.

Description: Individuals of this species attain a length of 120-160 \( \mu m \), excluding caudal furca, and a maximum width of 40-45 \( \mu m \). Body is typically of chaetonotoid appearance, with a distinct head, neck, trunk and caudal furca. The head is 5-lobed, 30-35 \( \mu m \) in maximum width and bears 4 groups of tactile cilia on the lateral edges. Each group is inserted in the groove between the 2 head lobes and comprises 3 cilia 15-20 \( \mu m \) long. The neck is about 30 \( \mu m \) at its maximum width. Trunk is widest in the mid body region. Caudal furca are conical, 20 \( \mu m \) long and carry an adhesive tube 10 \( \mu m \) long. In relaxed specimens, the furca are 25 \( \mu m \) apart between their distal ends.

The cuticular armature consists of simple spines arising from triradiate scales 3-6 \( \mu m \) in size. The scales have pointed anterior and lateral tips, while the lateral and posterior edges have concave borders. The spines arise on the posterior border of the scales. There are 7 longitudinal rows of spines on the dorsal surface, each row consisting of about 12 spines measuring 5-20 \( \mu m \) long. The scales and spines increase in size gradually from the anterior region to the mid-trunk region and then decrease posteriorly. The scales and spines on the head are, however, shorter than those on the posterior part of the trunk and are also seen to extend on the furcal bases. Ventral ciliation occurs in two longitudinal patches, one on either side of the digestive tract. These patches, however, do not extend to the posterior part of the trunk.

In the digestive tract, the mouth is terminal, 8 \( \mu m \) in width and inclined to the ventral surface. Pharynx is 40 \( \mu m \) long, with a distinct posterior bulb. The gut following the pharynx is undifferentiated and 95 \( \mu m \) long. Anus is subterminal and opens on the dorsal surface 5 \( \mu m \) from the posterior border. A single dorsal ovum 45 x 30 \( \mu m \) in size was observed in a mature specimen. Further details of the gonads were not observed.

Remarks: Remane (1936) divided the species of the genus Chaetonotus Ehrenberg into 4 main groups, viz., the hermaphroditic, simrothi, schultzei and maximus groups. According to this classification, \( C. \) triradiatus n. sp. falls within the maximus group of chaetonotods having dermal scales with only one spine. Among the large number of the species of this group hitherto described, the new species closely approaches \( C. \) larus O.F. Muller, 1748 in the shape of the body and the structure of the cuticular armature. \( C. \) triradiatus is, however, distinguished from \( C. \) larus and other species of the genus in the triradiate shape of the scales with pointed tips and concave borders, which extend even on the furcal bases. The new specific name \( triradiatus \) refers to the shape of the dermal scales.

Diagnostic features: Body typically chaetonotoid in appearance. Adult specimens 120-160 \( \mu m \) long excluding caudal furca and 40-45 \( \mu m \) in maximum width. Head 5-lobed and bears 4 groups of tactile cilia 15-20 \( \mu m \) long. The tail forks are conical, 20 \( \mu m \) long and carry adhesive tubes 10 \( \mu m \) long. Cuticular armature consists of 7 longitudinal rows of triradiate scales with pointed tips and concave borders. Spines simple. Scales and spines increase in size gradually from anterior to the mid-trunk region and then decrease posteriorly. Scales and spines extend on to furcal bases. Ventral ciliation in two longitudinal bands excepting the posterior region. Pharynx 40 \( \mu m \) long with a distinct posterior region. Pharynx 40 \( \mu m \) long with a distinct posterior bulb.

Fig. 6. *Chaetonotus triradiatus* n. sp.
A. Adult, dorsal view; B. Adult, ventral view; C. Anterior scale; D. Posterior sacle.
57. Chaetognathus sp.

**Material examined**: 2 ex., Minicoy, 14.3.83; 1 ex., Kavaratti, 20.3.83.

**Description**: Body shape characteristic of the genus with distinct head, neck and trunk. Head unlobed and bears 2 pairs of long ciliary tufts. Neck is narrow. Posterior end of trunk is rounded ending in two caudal furca 18 μm long. Dorsal body surface covered with triangular scales 5 μm long in 12 longitudinal rows. The spines which project from central part of scales are 6-8 μm long. This species belongs to the hermaproditic group based on the structure of scales. Ventral cilia occur in 2 longitudinal bands lateral to the digestive tract. Pharynx non-bulbous at the posterior end. Gonads were not studied in detail, but the presence of paired testes shows that the species is hermaphroditic.

**Measurements**: Length 0.17 mm and maximum width 0.04 mm.

**Remarks**: Specific identification of the material needs further study.

**Habitat**: Fine and medium sands, intertidal zone, lagoon beach.

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58. Aspidophorus marinus Remane


**Material examined**: 2 ex., Minicoy 15.3.83; 1 ex., Kavaratti, 19.3.83.

**Diagnostic features**: Chaetognath body covered with dorsal and lateral scales mostly pedunculated. The stalked scales are 45-50 in each longitudinal row and each scale measures 2.0-2.5 μm in size. A pair of lateral refractive bodies on head are characteristic of the species. Two pairs of lateral tufts of sensory bristles occur on head. Two laterally directed sensory bristles occur at the dorsal surface of the furcal bases. Pharynx forms about 1/3 of the total gut length with distal part without a bulb. Caudal furca slightly curved inside and 20 μm long. Weakly thigmotactic in habits.

**Measurements**: Lengths 0.15 mm and maximum width 0.04 mm.

**Remarks**: The specimens agree well with the original description of the species except for minor variations in the relative measurements of the body parts.

**Habitat**: Fine and medium coralline sand between low and half-tide levels, intertidal zone, lagoon beach.

**Distribution**: Eurytopic along the coasts of Atlantic, Pacific and Indian Oceans.

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59. Echinoderes ehlersi Zelinka

1913. Echinoderes ehlersi Zelinka, Deut. Sudpolar-Expedition, 14 : 419.
Material examined: 2 ex., Minicoy, 11.3.87.

Diagnostic features: Body elongate and dorsoventrally compressed. Second segment with 16 placids. Trunk segments pilose without distinct pattern of ornamentation. Middorsal spines present on segments 6-10 and increase in length posteriorly. Lateral spines shorter in females and longer in males with their length increasing posteriorly. Lateral terminal spines in both sexes are of the same size. Males lack lateral terminal accessory spines present in females. Pigment eye spots, mid-dorsal, sub-dorsal and ventrolateral sensory spots, present. Weakly thigmotactic.

Measurements: Length 260-290 μm.

Remarks: The specimens examined conform well with the original description of the species made from Zanzibar in all the important characters, although it did not include morphometric data and figures with details of the external features. This is the first record of the species from Lakshadweep.

Habitat: Superficial layers of fine coralline sediment below low water level, lagoon beach.

Distribution: Widely distributed along the coasts of the Indian Ocean between Zanzibar and Andaman Islands.

60. Echinoderes sp.

Material examined: 1 ex., Minicoy, 11.3.87.

Diagnostic features: Body elongate and vermiform. Length-width ratio is about 5:1. Mid-dorsal spines present on zonites 6-10 with their length increasing posteriorly. Lateral spines occur on zonites 6-10. Paired lateral end spines are 120 μm long. Posterior margins of the zonites 3-11 bear minute hair-like processes. Somatic ornamentation punctate. Eyes are not seen. Dorsolateral and ventrolateral muscle scars indistinct. Pachycycli well developed, with distinct pattern on ventromedian and posterolateral plates. Male unknown.

Measurements: Length 320 μm.

Remarks: Among the species of the genus Echinoderes, the single specimen examined closely approaches E. pennaki Higgins (1960) described from Puget Sound on the Pacific coast, with some differences in the disposition of terminal spines. However, further detailed examination of the material is required for confirming its specific identity.

Habitat: Superficial layers of fine coralline sand below low water level, lagoon beach.

Class CONCHORHAGEA
Order CONCHORHAGIDA
Family CATERIIDAE
Genus Cateria Gerlach, 1956

61. Cateria gerlachi Higgins


Material examined: 1 ex., Androth, 23.2.83; 1 ex., Amini, 27.2.83.

Diagnostic features: Body long and cylindrical with 11 visible segments bearing long lateral spines from fifth segment backwards. Seven middorsal spines are prominent...
on second, third, fourth, sixth, eighth, ninth and tenth segments. Midterminal spine equals to body length. Terminal zonite with 2 pairs of elongated lateral spines. Dorsal sensory organ absent between zonites 7 and 8. Body flexible and typically suited for life in medium and coarse sands. Cuticular ornamentation distinct. Two ventral grooves extend from second zonite to seventh and merge into one from eighth to tenth zonites.

**Measurements** : Length 0.42 mm and maximum diameter 0.06 mm. Midterminal spine 0.4 mm long.

**Remarks** : The material corresponds well with the original description of the species made from the beach sands of Waltair coast.

**Habitat** : Coarse coralline sand with fine shell gravel and little detritus 10 cm below surface near mid water level, intertidal zone, lagoon beach.

**Distribution** : Andhra and Orissa coasts, Andaman Islands, Lakshadweep.

### Phylum ANNELIDA

### Class ARCHIANNELIDA

### Family POLYGORDIIDAE

### Genus Polygordius Schneider, 1868

62. *Polygordius madrasensis* Aiyar and Alikunhi


**Material examined** : 2 ex., Androth, 25.2.83; 1 ex., Amini, 27.2.83.


**Measurements** : Length 5.0-6.0 mm and diameter 0.16 mm. Tentacles 0.15 long. Anal cirri 0.07 mm long.

**Remarks** : The specimens conform well with the original description of the species from Madras coast but for the smaller body size of the local forms.

**Habitat** : Coarse coralline sand with fine shell gravel and little detritus near low water level in relatively exposed areas, intertidal zone.

**Distribution** : Andaman Islands, Lakshadweep, Indian and South African coasts.

63. *Polygordius uroviridis* Aiyar and Alikunhi


**Material examined** : 1 ex., Androth, 22.2.83.

**Diagnostic features** : Body pale-white with 25-35 segments. Hypodermal glands present. Body ciliation absent. Head distinct with 2 short cephalic tentacles and 2 dark irregular eyes. Pygidium swollen, without anal lobes or cirri, but with a dark band of adhesive glands all around. Hypodermal glands best developed on pygidium. Sexes separate. Gonads develop from tenth segment onwards. Minute palpacils in groups of 3-
5 project from sides of body and are well developed on posterior margin of pygidium. Highly thigmotactic.

**Measurements**: Length 4.0 mm and diameter 0.14 mm. Tentacles 0.14 mm long. Anal bulb 0.12 mm wide.

**Remarks**: The specimen examined conforms well with the original description made from Madras coast. The reproductive organs of the species, however, still remain to be described in detail for a better comparison of the material collected from different geographical regions.

**Habitat**: Coarse coralline sand near low water level under exposed conditions, intertidal zone.

**Distribution**: Indian and South African coasts, Lakshadweep.

**Family**: PROTODRILIDAE

**Genus**: Protodrilus Hatschek, 1882

**64. Protodrilus indicus** Aiyar & Alikunhi


**Material examined**: 1 ex., Kavaratti, 20.2.83; 2 ex., Kavaratti, 19.3.83; 1 ex., Agatti, 7.2.87; 1 ex., Bangaram, 10.2.87.


**Measurements**: Length 2.0-3.0 mm and width 0.06 mm. Tentacles 0.25 mm long.

**Remarks**: The material conforms well with the original description of the species from Madras coast in all the important features.

**Habitat**: Medium and coarse coralline sand with little detritus between low and mid-water levels, intertidal zone, lagoon beach.

**Distribution**: India, Lakshadweep, Andaman Islands, Malaysia, New Caledonia, Galapagos Islands.

**Family**: PROTODRILIDAE

**Genus**: Protodrilus Hatschek, 1882

**65. Protodrilus pierantonii** Aiyar and Alikunhi


**Material examined**: 1 ex., Androth, 22.2.83; 2 ex., Androth, 23.2.83; 3 ex., Kavaratti, 24.3.83; 1 ex., Kavaratti, 29.1.87; 2 ex., Kavaratti, 31.1.87.

**Diagnostic features**: Body pale white with 30-40 segments. Cuticle sculptured. Hypodermal glands well developed all around the body. Head not swollen, indistinct,
with 2 long cephalic tentacles, 2 statocysts and 4 incomplete ciliary bands. Eyes absent. Three pygidian lobes present, the median one being rudimentary. Lateral lobes broad, adhesive and fan-shaped. Nephridia are macrotype. Sexes separate. Gonads develop from Sixteenth segment onwards. Sperms are of two types, large and small, both being motile and whip-like. Salivary glands occur from second to sixteenth segments.

**Measurements** : Length 3-4 mm and width 0.07 mm. Tentacles 0.18 mm long.

**Remarks** : The specimens are identical with original description and figures given for the species in all the essential features.

**Habitat** : Coarse and medium sand with a little detritus between low and half-tide levels, intertidal zone, lagoon and seaward beaches.

**Distribution** : India, Lakshadweep, Andaman Islands, Galapagos Islands.

66. Protodrilus sp.

**Material examined** : 4 ex., Agatti, 7.2.87; 2 ex., Bangaram, 10.2.87; 2 ex., Agatti, 11.2.87.

**Diagnostic features** : Body short, vermiform, dorsoventrally flattened and slightly tapers posteriorly. Number of somatic segments vary between 20 and 30. No chaetae on body. Cuticle thin and devoid of any external ornamentation. Hypodermal glands poorly developed, scarce and oval-shaped. Head hot swollen anteriorly and indistinct from the rest of body. Two long cephalic tentacles, 2 statocysts, 2 dark eye spots, 2 nuchal organs and 4 ciliary bands present on head. Two well developed and elongated caudal lobes occur on pygidium. Ventral groove indistinct. Ventral ciliation well developed extending between mouth and anus. No observations were made relating to internal structures as salivary glands, nephridia and gonads.

**Measurements** : Length 2.0-3.0 mm and width 0.5 mm. Tentacles 0.24-0.28 mm long.

**Remarks** : In the structure of the external features, the present specimens closely approach *P. indicus* Aiyar and Alikunhi but for the presence of 2 dark eye spots on head and the shape of hypodermal glands. However, a further detailed study of the material is needed to clearly establish its specific identity.

**Habitat** : Medium and coarse coralline sand with little detritus between low and mid-water levels, intertidal zone, lagoon beach.

Family **SACCOCIRRIDAE**

Genus **Saccocirrus Bobretzky, 1872**

67. Saccocirrus minor Aiyar and Alikunhi


**Material examined** : 2 ex., Androth, 22.2.83; 4 ex., Kavaratti, 6.3.83; 1 ex., Agatti, 7.2.87; 1 ex., Bangaram, 10.2.87.

**Diagnostic features** : Minute active worms with 80-100 setigerous segments. Head conical with a pair of long tentacles, 2 dark conspicuous eyes and 2 oblique muchal organs located at the base of tentacles. Pygidium without bifurcation, anal cirri or anal lobes but with 2 glandular ventral adhesive pads. Parapodia occur from second segment backwards. Setae with expanded tips. Pharynx without ventral muscular pad. Body

**Measurements**: Length 10.0-12.0 mm. Tentacles 0.8-1.0 mm long.

**Remarks**: The specimens examined agree with the original description of the species except for a minor variation with the number of body segments.

**Habitat**: Coarse and medium coralline sands with little detritus near low water level, intertidal zone, lagoon beach.

**Distribution**: India, Lakshadweep, Andaman Islands, Malaysia.

68. Saccocirrus orientalis Alikunhi


**Material examined**: 2 ex., Agatti, 7.2.87; 2 ex., Kavaratti, 6.3.83; 1 ex., Kavaratti, 7.3.83; 1 ex., Kadmat, 26.1.87; 3 ex., Kavaratti, 18.2.83.

**Diagnostic features**: Minute white worms, with 120-150 setigerous segments. Head triangular with a pair of long tentacles, 2 distinct dark eyes and 2 oblique ciliated nuchal organs. Pygidium not bifurcated posteriorly and anal cirri or lobes absent. Instead, 2 ventral adhesive pads occur one on either side of the ventral group of the pygidium. Parapodia occur from second segment backwards. Parapodial setae with broad channeled tips, without bifurcated prongs. Pharynx without ventral muscular pad. Sexes separate. Gonads develop from fiftieth segment backwards on both sides of the digestive tract. Last 15-20 body segments are sterile.

**Measurements**: Length 9.0-12.0 mm. Tentacles 0.8-1.0 mm long.

**Remarks**: The specimens agree well with original description of the species made from Madras coast with some important variations. The type specimens had only 50-70 somatic segments, with the reproductive organs extending from twentieth segment onwards. The Lakshadweep specimens have 120-150 segments, with gonads developing from fiftieth segment onwards. The cephalic tentacles for the Madras specimens were described as moniliform, while the local forms are not so. Hence, the validity of this species is to be examined in light of the morphological variations observed in these different geographical regions.

**Habitat**: Coarse and clean coralline sands between low and half-tide levels, intertidal zone, lagoon beach.

**Distribution**: Recorded on the shores of the Indian Ocean from India, Lakshadweep, South Africa and Andaman Islands.

69. Saccocirrus krusadensis Alikunhi


**Material examined**: 2 ex., Androth; 25.2.83; 1 ex., Androth, 28.2.83; 1 ex., Kavaratti, 7.3.87.

**Diagnostic features**: Minute worms, white in colour with 100-120 segments, the last 2 being achaetous. Head triangular with a pair of long tentacles, 2 conspicuous brown eyes and 2 ciliated nuchal organs. Pygidium deeply bifurcated into 2 long caudal

**Measurements** : Length 12.0-15.0 mm. Tentacles 1.2 mm long.

**Remarks** : The material examined conformed well with the original description of the species made from Krusadai Island in the Gulf of Manaar. Minor variations of the material, however, occurred in the size of the arms of the medium setae. The arms of the local specimens are remarkably shorter in size compared to the measurements given for the type specimens.

**Habitat** : Coarse and coralline sand near low water level, lagoon beach.

**Distribution** : India, Lakshadweep, South Africa, Andamans, Australia (Indian and Pacific Oceans).

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**Family DINOPHILIDAE**

**Genus Dinophilus Schmidt, 1848**

70. *Dinophilus gyrocilatus* (Schmidt)


**Material examined** : 2 ex., Minicoy, 16.3.83; 1 ex., Kavaratti, 19.3.83.

**Diagnostic features** : Body transparent, with distinct head and somatic segments. Head triangular, with pointed anterior end and broad posteriorly. Ciliated anal cone present at the posterior end. Conspicuous ciliary girdles occur 2 on head and 8 on trunk. Two dark bean-shaped eyes present on head between the 2 ciliary girdles. Sexual dimorphism present, the male being much reduced in size compared to the female. Gonads paired occurring on either side of the intestine. Epipel in distribution.

**Measurements** : Length 0.6-0.7 mm and body diameter 0.1 mm.

**Remarks** : The material corresponds well with the original description of the species, except for a minor variation in body size and the description of the species, except for a minor variation in body size and the disposition of ciliary girdles. This species is recorded for the first time from Lakshadweep.

**Habitat** : Algae and fine coralline sediment between low and half-tide levels, intertidal zone, lagoon beach. On European coasts, the species is an inhabitant of the intertidal zone occurring among algae or on the surface sediments and more seldom in the interstitial habitat (Jouin, 1971). In fact, the author observed the species to exhibit a similar distribution on the Indian coast as well. But, Rao and Ganapati (1968) reported the species on Waltair coast at a depth of 20 cm below the surface sand, which is to be considered accidental in the habitat.

**Distribution** : Eurytopic on the coasts of North Atlantic, Mediterranean Sea and Indian Ocean.

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**Genus Diurodrilus Remane, 1925**

71. *Diurodrilus benazzii* Gerlach


**Material examined** : 1 ex., Kavaratti, 17.2.83; 2 ex., Minicoy, 12.3.83.
Diagnostic features: Minute worms with distinct head and trunk with 8 segments. Head oblong, with several sensory bristles on anterior and lateral margins. Eyes absent. Dorsolateral epidermal glands well developed and numerous. Short bristles occur on lateral margins of trunk. Pygidium deeply cleft posteriorly ending in two adhesive anal lobes. Buccal cavity deep and ciliated. Digestive tract undifferentiated. Anus subterminal. Gonads develop lateral to the gut from fifth trunk segment backwards. Negatively phototactic and highly thigmotactic.

Measurements: Length 0.28-0.29 mm and width 0.04 mm.

Remarks: The specimens examined correspond well with the original description of the species made from the coasts of the Mediterranean Sea.

Habitat: Medium coralline sand 5 cm below surface between low and half-tide levels, intertidal zone.

Distribution: Mediterranean Sea, Lakshadweep, India, Andaman Islands.

Family NERILLIDAE
Genus Nerilla Schmidt, 1848

72. Nerilla antennata Schmidt

1927. Nerilla antennata Schmidt. Fauna de France, 16: 482

Material examined: 1 ex., Kavaratti, 3.2.87; 1 ex., Agatti, 7.2.87.

Diagnostic features: Minute segmented worms with transparent body. Head distinct with 3 several-segmented antennae, 2 palps, 2 pairs of dark eye-spots and a pair of lateral nuchal organs. Trunk with 7 parapodial segments. Parapodium with distinct dorsal cirrus and 2 bunches of simple capillary setae. Two lateral tufts of cilia occur between parapodia. Parapodia on pygidial segment without dorsal cirri. Pygidium with 2 long segmented anal cirri. Mouth ventral and occurs at the level of lateral nuchal organs. Digestive tract undifferentiated. Anus terminal on last segment. Gonads occur lateral to the intestine from fifth trunk segment backwards.

Measurements: Length 0.8 mm and width 0.1 mm. Tentacles and anal cirri are 0.2 mm long.

Remarks: Some geographical variation has been reported by earlier workers for the lateral tufts of cilia in this species occurring on different coasts. The Lakshadweep specimens, however, consistently supported two tufts of the cilia between parapodia as those occurring on the coasts of India and Andaman Islands (Rao and Ganapati, 1968; Rao, 1980).

Habitat: Coarse and medium coralline sands with fine shell gravel and little detritus between low and half-tide levels, intertidal zone.

Distribution: Widely distributed on the coasts of Baltic, North Sea, Mediterranean, Atlantic, Pacific and Indian Oceans.

Genus Nerillidium Remane, 1925

73. Nerillidium sp.

Material examined: 2 ex., Minicoy, 12.3.83; 1 ex., Kavaratti, 18.3.83.

Description: Minute segmented worms, with transparent body, distinct head and...

**Measurements**: Length 0.5-0.6mm. Tentacles 0.06mm. Anal cirri 0.2mm.

**Remarks**: The present specimens closely approach *N. mediterraneum* Remane (1928) in the structure and disposition of body organs. However, a further detailed study is necessary to ascertain the specific identification of the material.

**Habitat**: Medium coralline sand with little detritus near mid-water level, intertidal zone, lagoon beach.

Class POLYCHAETA
Order ERRANTIA
Family PISONIDAE
Genus Pisione Grube, 1856

74. Pisione gopalai (Alikunhi)


**Material examined**: 1 ex., Androth, 25.2.83.

**Diagnostic features**: Minute slender worms 5-8mm long. Body vermiform with 25-40 setigerous segments. Prostomium with 2 dark eyes. Two pairs of cephalic and 2 anal cirri present. A pair of well developed pear-shaped adhesive pads occur on pygidium. The species is highly thigmotactic and firmly sticks to sand grains during commotion in the habitat. Ventral cirrus of buccal parapodium globular and that of first setigerous segment elongated. Parapodia carrying receptacular seminis are completely atrophied and carry only 2 acicular setae. A pair of denticulate jaws occur in the buccal region.

**Measurements**: Length 8.0mm and width 0.18mm.

**Remarks**: The specimens examined are smaller in size compared to the original description of the species from Madras beach.

**Habitat**: Coarse coralline sand with fine shell gravel near low water level, intertidal zone, lagoon and seaward beaches.

**Distribution**: East coast of India, Lakshadweep.

75. Pisione complexa Alikunhi


**Material examined**: 2 ex., Kavaratti, 20.2.83; 1 ex., Androth, 23.2.83; 1 ex., Kalpeni, 13.2.87.

**Diagnostic features**: Body vermiform, with 35-60 setigerous segments. Prostomium with 2 dark eyes. Buccal segment with a pair of denticulate jaws. Two pairs of cephalic tentacles are directed forwards. Two long anal cirri present on pygidial segment. anal segment semicircular without anal glands and adhesive pads. Parapodial
segments carrying receptacular seminis are not modified. Upto six pairs of testes, genital funnels, sperm sacs and copulatory organs. Sperms large and non-motile. Ovaries upto 20 pairs.

**Measurements** : Length 8.0-12.0mm and width 0.15-0.20mm.

**Remarks** : The material conforms well with the original description of the species made from Madras beach.

**Habitat** : Coarse coralline sand with fine shell gravel and little detritus between low and half-tide levels, intertidal zone, lagoon and seaward beaches.

**Distribution** : India, Lakshadweep, Andaman Islands.

76. *Pisione africana* Day


**Material examined** : 1 ex., Minicoy, 15.3.83.

**Diagnostic features** : Small thread-like worms with 50-70 setigerous segments. Prostomium with 2 pairs of cephalic tentacles and completely enveloped by the peristomial segment. Two pairs of fused eyes and two pairs of buccal jaws present. Peristomial segment with a pair of large palps and two pairs of biarticulate tentacular cirri. Dorsal cirrus of second setiger enlarged. Normal parapodia with subequal dorsal and ventral cirri. Two internal acicula and 5 setae present on parapodia. One seta with expanded blade, others with falcigerous blades. Reproductive organs unknown.

**Measurements** : 12.0-15.0 mm.

**Remarks** : The single specimen examined conformed well with the original description of the species made from the coast of Southern Africa. This is the first record of the species from Indian coast.

**Habitat** : Coarse coralline sand below low water line, lagoon beach.

**Distribution** : Widely distributed along the coasts of Pacific, Atlantic and Indian Oceans.

Genus *Pisionidens* Aiyar and Alikunhi, 1942

77. *Pisionidens indica* (Aiyar and Alikunhi)


**Material examined** : 1 ex., Kavaratti, 6.3.83; 2 ex., Minicoy, 10.3.83; 1 ex., Kavaratti, 19.3.83; 1 ex., Agatti, 8.2.87.

**Diagnostic features** : White cylindrical worms with tapering ends. Reduced head and parapodia. Two pairs of cephalic cirri, one directed forwards and the other lateral. Eyes absent. Proboscis with 4 chitinous jaws. Two long anal cirri. Buccal and the 6 succeeding segments non-setigerous. Ventral cirrus of first segment and dorsal cirrus of second segment are elongate and function as tentacular cirri. Parapodia of the next 4 segments are minute and inconspicuous. Only one seta occurs as aciculum in each parapodium. Highly active and negatively phototactic.

**Measurements** : Length 16.0-18.0mm and diameter 0.8mm.

**Remarks** : The specimens agree well with the original description of the species from Madras sandy beach.
Habitat: Coarse coralline sand with fine shell gravel near low water level, intertidal and subtidal zones, lagoon and seaward beaches.

Distribution: Cosmopolitan in tropical and subtropical sand beaches.

Family  HESIONIDAE
Genus  Microphthalmus Mecznikow, 1865

78. Microphthalmus urofrimbriatus Alikunhi

Material examined: 1 ex., Androth, 23.3.83.

Diagnostic features: Slender worms with 50-70 setigerous segments. Head with 2 small eyes, 2 palps, 3 tentacles, 6 pairs of tentacular cirri and a pair of nuchal organs. Anal segment with a well developed plate with fimbriated margin and 2 long anal cirri. Parapodia well developed; dorsal lobe with 12-18 capillary bristles; ventral lobe with simple and compound setae. Sexes united. Male elements confined to anterior segments and female elements to the posterior segments. Partially protrusible penes occur between second and third setigerous segments. Ova bearing segments with paired receptacula seminis. Highly thigmotactic.

Measurements: Length 5-6mm. Anal cirri 0.4 mm.

Remarks: The material conforms well with the original description of the species from Madras sandy beach except for a variation in body colour. The local specimens are grey in colour, while the type specimens were reported pale yellow.

Habitat: Coarse coralline sand with fine shell gravel between low and half-tide levels, intertidal zone, lagoon and seaward beaches.

Distribution: India, Andaman Islands, Lakshadweep, South Africa, Red Sea.

Genus  Hesionides Friedrich, 1937

79. Hesionides arenaria Friedrich

Material examined: 1 ex., Kavaratti, 20.2.83; 2 ex., Agatti, 8.2.87; 1 ex., Bangaram, 10.2.87; 1 ex., Kalpeni, 13.2.87.


Measurements: Length 1.2-1.6mm and width 0.08mm.

Remarks: Compared to the type specimens described from North Sea, the anal lamellae in the local forms are narrower and do not overlap. Otherwise, the specimens agree fairly well with the original description except for minor variations in the length of cephalic appendages.

Habitat: Coarse and medium coralline sands between low and half-tide levels, intertidal zone, sheltered and exposed areas.

Distribution: Cosmopolitan.
80. Hesionides gohari Hartmann-Schroder


Material examined : 1 ex., Kavaratti, 6.3.83; 1 ex., Minicoy, 14.3.83; 1 ex., Agatti, 7.2.87; 2 ex., Bangaram, 10.2.87.


Measurements : Length 0.6-1.0 mm and width 0.06-0.07 mm.

Remarks : The specimens correspond well with the original description of the species from Red Sea, except for variation in body colour.

Habitat : Medium coralline sand between low and mid-water levels, intertidal zone.

Distribution : Tropical and temperate beaches on the coasts of Mediterranean Sea, Atlantic and Indian Oceans.

81. Hesionides minima Westheide and Rao


Material examined : 1 ex., Androth, 23.2.83; 1 ex., Kiltan, 2.3.83.


Measurements : Length 0.6-0.8 mm and width 0.06 mm.

Remarks : The specimens closely resemble H. gohari occurring in the same habitat, but for the narrow posterior end, large notosetae bidentate neurosetae and the position of male opening, which are distinct from the latter. The material from Lakshadweep agreed fairly well with the original description from Madras coast.

Habitat : Medium coralline sand near mid-water level, intertidal zone, lagoon beach.

Distribution : India, Lakshadweep.

82. Hesionides sp.

Material examined : 3 ex., Kavaratti, 6.3.83; 1 ex., Kavaratti, 18.3.83; 2 ex., Agatti, 8.2.87; 1 ex., Bangaram, 10.2.87.

Description : Minute contractile worms, with elongated and compact body. Dorsal and ventral tentacles sub-equal in length. Somatic segments vary from 18 to 26, which taper slightly posteriorly. Pygidium deeply bifurcated with 2 distinctly separated and elongated anal lamellae. Anal cirri thread-like, without swollen bulbs at base. Parapodia biramous. Notopodia with notosetae shaply bent at the distal part. Neuropodia with 6

**Measurements**: Length 1.2-1.5mm long and width 0.08-0.10mm.

**Remarks**: Among the known species of the genus *Hesionides*, the present specimens approach *H. similis* Rao (1978) described on the Orissa coast in major morphological characters. But the structure of cephalic tentacles, parapodia and anal lamellae presents some variations. Specific determination of the material requires further study.

**Habitat**: Coarse and medium coralline sand with little detritus between low and mid-water levels, intertidal zone, lagoon beach.

**Family** Phyllodocidae

**Genus** Hesionura Hartmann-Schroder, 1958

83. *Hesionura elongata* (Southern)


**Material examined**: 1 ex., Androth, 25.2.83.

**Diagnostic features**: Head triangular with four anteriorly directed tentacles at the narrow anterior end and 2 dark eyes at the wider base. Long tentacular cirri occur on first body segment lacking parapodia. Uniramous parapodia typical of the genus, with a dorsal and a ventral cirrus. Four compound setae with expanded blades and one simple supporting seta with blunt end present. Two long anal cirri occur on pygidium. Body transparent and white in colour. Highly active and weakly thigmotactic.

**Measurements**: Length 4.0mm and width 0.15mm.

**Remarks**: The specimens conform well with the original description of the species but for the longer tentacular and anal cirri. This species is recorded for the first time from Lakshadweep.

**Habitat**: Coarse coralline sand with fine shell gravel near low water level, lagoon beach.

**Distribution**: Tropical and subtropical beaches on the coasts at Atlantic and Indian Oceans.

**Family** Syllidae

**Genus** Eusyllis Malmgren, 1867

84. *Eusyllis homocirrata* Hartmann-Schroder


**Material examined**: 1 ex., Androth, 22.2.83, 2 ex., Kiltan, 4.3.83.

**Diagnostic features**: Small transparent worms with 16-18 setigerous body segments. Prostomium with 2 long triangular palps, 3 tentacles and 2 pairs of tentacular cirri. Eyes absent. All tentacles and cirri are jointed at the base. Dorsal cirri long, but absent on second setigerous segment. Ventral cirri finger-like. Parapodia uniramous with
Genus **Typosyllis** Langerhans, 1879


**Material examined**: 1 ex., Kavaratti, 21.3.83; 1 ex., Agatti, 7.2.87.

**Diagnostic features**: Long and thin worms with 90-120 setigerous segments. Head with 2 pairs of eyes, 2 long palps, one median and 2 lateral tentacles. Tentacles and cirri are ringed. Pygidium with 2 long anal cirri and a finger-like papilla in between. Pharynx long, lies between 3 and 12 segments, with an anterior conical tooth. Parapodia are short, dorsal cirrus long and moniliform, ventral cirrus finger-like. Each parapodium with 10 short setae bearing serrated terminal blades. Gizzard with 36 rings extending between twelfth and eighteenth setigerous segments.

**Measurements**: Length 1.6-1.8 cm and width 0.2 mm.

**Remarks**: The specimens examined are slightly smaller in size compared to the original description of the species.

**Habitat**: Coarse coralline sand with fine shell gravel near low water level, lagoon and seaward beaches.

**Distribution**: Cosmopolitan.

86. **Typosyllis sp.**

**Material examined**: 1 ex., Minicoy, 14.3.83.

**Description**: Long slender worms with 70-90 setigerous segments. Head with 2 pairs of circular eyes, 2 oblong palps, one median and 2 tentacles. Tentacles and dorsal cirri moniliform. Pharynx with conical tooth at the anterior end. Falcate setae are conspicuously bidentate. Pygidium with 2 long anal cirri and a conical papilla in between. Parapodia short, dorsal cirrus long and moniliform, ventral cirrus short and conical. Each parapodium with 8-10 setae bearing serrated terminal blades. Acicular seta stout and pointed at the end. Gizzard with 26 rings extending between sixth and eighth setigerous segments. Body transparent and weakly thigmotactic.

**Measurements**: Length 1.2 mm and width 0.16 mm.

**Remarks**: Specific identification of the material needs further study.

**Habitat**: Coarse coralline sand with fine shell gravel near low water level, intertidal zone, lagoon beach.
Genus Sphaerosyllis Claparede, 1863

87. Sphaerosyllis minima Hartmann-Schroder


Material examined: 1 ex., Kiltan, 3.3.83.


Measurements: Length 0.8mm and width 0.1mm.

Remarks: The material conforms well with the original description of the species from Red Sea.

Habitat: Algae and fine detritus coralline sand near low water level, intertidal zone, lagoon beach. This is the first record of the species from Lakshadweep.

Distribution: Red Sea, Lakshadweep, Bay of Bengal.

88. Sphaerosyllis bengalensis Rao and Ganapati


Material examined: 2 ex., Androth, 23.1.83; 1 ex., Kavaratti, 6.3.83.

Diagnostic features: Minute worms with 13-15 setigerous segments, with body tapering towards both the extremities. Prostomium with a pair of brown eyes, 2 conical palps fused dorsally by a papillated skin, 3 tentacles and a pair of tentacular cirri. Dorsal cirri absent on second pair of parapodia. Parapodia with one simple and 5 compound setae. Pygidium with 2 club-shaped anal cirri. Proboscis with conical tooth. Males smaller than females. Embryos develop attached to genital segments until juveniles are released. Eggs are borne in eighth to tenth setigerous segments.

Measurements: Length 1.0-1.2 mm and width 0.08 mm.

Remarks: The material conforms well with the original description of the species from Waltair coast. This species is recorded for the first time from Lakshadweep.

Habitat: Coarse and medium coralline sand with little detritus 5-10 cm below surface between low and mid-water levels, intertidal zone, lagoon beach.

Distribution: India, Andaman Islands, Lakshadweep, Sri Lanka.

Genus Brania Quatrefages, 1865

89. Brania subterranea (Hartmann-Schroder)


Material examined: 1 ex., Agatti, 8.2.87; 1 ex., Bangaram, 10.2.87; 1 ex., Kalpeni, 13.2.87.

Diagnostic features: Minute worms with 25-30 setigerous segments. Prostomium with 2 long palps, 3 tentacles and 2 pairs of tentacular cirri. Palps are partly covered

**Measurements**: Length 1.8-2.0mm and width 0.12 mm.

**Remarks**: The specimens agree well with the original description and figures given for the type material from the Atlantic coast of Brazil.

**Habitat**: Coarse coralline sand between low and mid-water levels, intertidal zone, lagoon and seaward beaches.

**Distribution**: Eurytopic in tropical and subtropical beaches.

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### Genus Petitia Siewing, 1955


**Material examined**: 1 ex., Agatti, 7.2.87; 1 ex., Bangaram, 10.2.87.

**Diagnostic features**: Minute transparent worms with 12-16 setigerous segments. Prostomium with 2 elongate palps, 3 tentacles and 2 pairs of tentacular cirri. First pair of parapodia with elongate tentacular cirri. Two dark eyes present in juveniles. Parapodia uniramous with finger-like dorsal and ventral cirruses, one simple and 7 compound setae bearing terminal blades. Pygidium with 2 anal cirri and a conical anal papilla. Pharynx with an anterior conical tooth. Gizzard with 16-20 transverse rings occupying second and third setigerous segments. Weakly thigmotactic.

**Measurements**: Length 1.4-1.6mm and width 0.08mm.

**Remarks**: The material conforms well with the original description of the species but for the smaller size. The juveniles were, however, more frequently encountered in the habitat compared to the adults.

**Habitat**: Coarse and medium coralline sand between low and half-tide levels, intertidal zone, lagoon beach.

**Distribution**: Widely distributed in tropical and warm temperate beaches.

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### Genus Ehlersia Quatrefages, 1865


**Material examined**: 1 ex., Androth, 24.2.83.

**Diagnostic features**: Slender worms with 90-120 setigerous segments. Anterior tentacles thin and subequal, palps long and distinct. Two pairs of eyes present. Pharynx very long with an anterior tooth. Parapodia with compound setae of two kinds: i) with a long, slender, slightly pectinate and bidentate piece, and ii) falcigerous setae with a short spinous bidentate end piece. Both types present in the same feet. Last parapodia with a dorsal and simple seta. Two anal cirri present. Tentacles and cirri are moniliform. Body transparent and weakly thigmotactic.
**Measurements**: Length 4.2 mm and width 0.2 mm.

**Remarks**: The specimens correspond well with the original description of the species but for the smaller body size and the number of setigerous segments. This is the first record of the species from Lakshadweep.

**Habitat**: Coarse coralline sand with fine shell gravel near low water level, intertidal zone.

**Distribution**: Mediterranean Sea, Atlantic and Indian Oceans.

**Family** GLYCERIDAE

**Genus** Goniadides Hartmann-Schorder, 1960.


**Material examined**: 1 ex., Kavaratti, 6.3.83; 2 ex., Minicoy, 11.3.83; 1 ex., Agatti, 7.2.87.

**Diagnostic features**: Slender worms with 40-50 setigerous segments. Prostomium conical, 8-ringed, the basal ring being the largest, while the distal one bears four 4-ringed tentacles directed anteriorly. Eyes absent. Two anal cirri occur on pygidial segment lacking parapodia. Pharynx with dark chitinous micro and macro jaws. Parapodia elongate with conical dorsal, ventral and medium cirri having finger-like tips. One simple internal seta bifid at the tip and 4 compound setae bearing terminal blades, present. Anterior segments with uniramous and posterior segments with biramous parapodia. Proboscis short and ventral in disposition.

**Measurements**: Length 4.5 mm and width 0.3 mm.

**Remarks**: The specimens examined correspond well with the original description of the species from Red Sea except for some minor variations in body size, segmentation of the cephalic tentacles and number of acicular setae. The cephalic tentacle are lacking a distinct segmentation in the Lakshadweep specimens.

**Habitat**: Coarse coralline sand with fine shell gravel near low water level, intertidal zone, sheltered and exposed situations.

**Distribution**: Red Sea, Lakshadweep, India, Andaman Islands.

**Phylum** ARTHROPODA

**Class** CRUSTACEA

**Order** COPEPODA

**Suborder** HARPACTICOIDA

**Family** LONGIPEDIIDAE

**Genus** Longipedia Claus, 1863


**Material examined**: 2 ex., Minicoy, 13.3.83; 1 ex., Kavaratti, 20.3.83; 1 ex., Agatti, 7.2.87; 1 ex., Bangaram, 10.2.87.

Measurements: Length 0.6-0.7 mm.

Remarks: The material corresponds well with the original description. The species is clearly distinguished from other members of the genus in the extreme length of abdominal spinules.

Habitat: Fine coralline sand and littoral algae near low water level, intertidal zone, lagoon beach.

Distribution: Widely distributed on warm tropical and temperate beaches in the Indo-Pacific region.

94. Longipedia kikuchii Ito


Material examined: 2 ex., Kalpeni, 13.2.87; 1 ex., Kavaratti, 15.2.87.

Diagnostic features: Fusiform body with large triangular rostrum and spiny anal operculum. Caudal ramus as long as wide. Inner ventral and inner terminal setae of caudal ramus elongate. Epidermal lappets of genital segment small. Abdomen ornamented with small spinules. Antennule 7-segmented, copiously setose and with 4 aesthetes, 2 of them situated on terminal segment. Antenna with 3-segmented endopod and 8-segmented exopod. Mandible exopod 3-segmented. Maxilliped not prehensile, with 12 terminal setae, 4 being extremely elongate. P.1-P.4 with both rami 3-segmented. Second exopod segment of P.1 with a modified seta, while the third endopod segment of P.2 is quite elongate. P.5 is distinctly biramous, with exopod bearing 6 setae in female and 7 setae in male.

Measurements: Length 0.8 mm.

Remarks: The specimens from Lakshadweep conform well with the original description of the species, but their morphology is closely related to L. coronata Claus. However, the recent revision of the genus by Wells (1980) clearly differentiates both these species, setting aside all doubts at rest. This species is recorded for the first time from Lakshadweep.

Habitat: Fine coralline sediment and algal thalli near low water level, intertidal zone, lagoon beach.

Distribution: Japan, Indonesia, Singapore, Andaman Islands, India, Lakshadweep.
95. Scottolana longipes (Thompson and Scott)

Material examined: 2 ex., Agatti, 7.2.87; 1 ex., Bangaram, 10.2.87.

Diagnostic features: Body linear, slightly fusiform and minutely punctate, without any demarcation between metasome and urosome. Last abdominal segment much reduced. Caudal ramus elongate, with 2 well developed terminal setae. Rostrum very large. Antennule segmentation indistinct, possibly of several segments. Exopod of antenna with 8 segments. Exopod of mandible 3-segmented. Exopod of maxilliped with 10 setae. Both rami of P.1-P.4 are 3-segmented. Last endopod segment of P.2-P.3 with very stout spines having blunt teeth along their edges. P.4 is very slender. P.5 is reduced to a narrow lappet with 4 setae.

Measurements: Length 1.2 mm.

Remarks: The original description of the species was confined to the female without full details of the body appendages. The very slender P.4 was the chief character of the species until Wells (1967) described further species of the genus. The present specimens, however, conform with the original description of the species except for some minor variations in the structure of antenna and mouth parts. These differences could possibly be due to evolution of new geographic races. This is the first record of the species from Lakshadweep.

Habitat: Detritus coralline sand and algal thalli near low water level, lagoon beach.


96. Ectinosoma melaniceps Boeck

Material examined: 2 ex., Kavaratti, 6.3.83; 1 ex., Minicoy, 11.3.83; 2 ex., Minicoy, 15.3.83; 1 ex., Agatti, 7.2.87; 2 ex., Bangaram, 10.2.87.

Diagnostic features: Body linear and fusiform, with distinct demarcation between metasome and urosome; widest at the posterior end of cephalothorax. Anal operculum lacking. Abdomen with bands of pustules. Caudal ramus as long as wide with 2 developed apical setae. Rostrum distinct and pointed anteriorly. Antennule 6-segmented with an aesthete on fourth segment. Exopod of antenna 3-segmented, the middle segment being very short. P.1-P.4 with both rami 3-segmented. Outer edges of all leg segments spinulose. P.5 in female quite variable. Basendopod of P.5 with 2 inner setae and exopod with 4 outer setae. Male antennule haplocerate. P.6 in male fused to segment, with a lateral seta.

Measurements: Length 0.4-0.5 mm.

Remarks: This widely distributed species is known to exhibit considerable geographical variation, particularly in the structure of P.5 in female. The present
material, however, agrees well with the detailed description of the species given by Lang (1965), except for the presence of the bands of pustules on abdomen.

**Habitat** : Littoral algae and detritus coralline sands near low water level, intertidal zone, lagoon beach.

**Distribution** : Cosmopolitan.

**Genus Halectinosoma** Lang, 1948


**Material examined** : 3 ex., Minicoy, 11.3.83; 1 ex., Minicoy, 14.3.83.

**Diagnostic features** : Body linear and slightly tapers posteriorly. Cephalothorax tapers from posterior to anterior. Rostrum short and truncate at apex. Anal operculum lacking. Cuticle punctate. Caudal ramus broader than long, with a long terminal seta and a short spine. Antennule 5-segmented with an aesthete on third segment. Male antennule chirocerate and highly modified. Exopod of antenna very long, robust and 3-segmented, with 2 terminal plumose setae on last segment. Maxilliped with second endopod segment with 3 setae. P.1-P.4 with both rami 3-segmented with spinulose outer edges. P.5 with confluent rami bearing 6 setae. P.6 in male is a small plate with an outer seta.

**Measurements** : Length 0.38-0.42mm.

**Remarks** : The material examined conforms well with the original description of the species made from Inhaca Island, Mozambique. The species is recorded for the first time from Indian coast.

**Habitat** : Detritus coralline sand and algae near low water level, intertidal zone, lagoon beach.

**Distribution** : South Africa, Lakshadweep.

**Genus Arenosetella** Wilson, 1932


**Material examined** : 1 ex., Androth, 23.2.83; 2 ex., Kavaratti, 7.3.83.

**Diagnostic features** : Body fusiform without demarcation between metasome and urosome. Cephalothorax rectangular anteriorly. Antennule 6-segmented with an aesthete on the fourth segment. Exopod of antenna 3-segmented, the last segment with 2 apical setae. Exopod of mandible single-segmented with 2 apical setae. P.1-P.4 are biramous, with both exopod and endopod 3-segmented. Distal segment of P.3 of exopod with 2 internal setae. P.5 is a biramous and triangular lamina with exopod bearing 3 apical setae and endopod with 2 inner setae. Anal segment with 2 pairs of curved dorsal claws. Caudal ramus slightly longer than broad, with 2 well developed apical setae.

**Measurements** : Length 0.5 mm.

**Remarks** : The specimens conform well with the original description of the species from Kiel Bay, despite the minor geographical variations reported from other global areas.
Habitat: Coarse coralline sand with fine shell gravel and little detritus near low water level, intertidal zone.

Distribution: Widely distributed in the beaches of Atlantic, Pacific and Indian Oceans.

Genus Lineosoma Wells, 1965

99. Lineosoma intermedia (Wells)


Material examined: 2 ex., Minicoy, 11.3.83.

Diagnostic features: Body linear and cylindrical. Cephalothorax rectangular. Last segment partially cleft and without anal operculum. Antennule 6-segmented with a terminal aesthete. Exopod of antenna is minute and 2-segmented with 1 and 2 setae, respectively. Both rami of P.2 to P.4 are 3-segmented. Second endopod segment of P.1 with 4 terminal setae. P.5 with distinct rami, exopod with 3 setae. Accessory seta absent. Antennule haplocerate in male and geniculate between second and third segments. P.6 in male is confluent, with a long seta on either side.

Measurements: Length 0.35 mm.

Remarks: The specimens from Minicoy agree well with the type specimens with a minor variation. The endopod segment of P.1 bears 4 terminal setae, while it was described 3 setae only for the type material. This is first record of the species from Indian coast.

Habitat: Medium coralline sand 5 cm below surface near mid-water level, intertidal zone.

Distribution: Mozambique, Lakshadweep, India, Andaman Islands.

Genus Hastigerella Nicholls, 1935

100. Hastigerella leptodera (Klie)


Material examined: 2 ex., Kavaratti, 21.3.83; 1 ex., Agatti, 7.2.87.

Diagnostic features: Body linear and cylindrical without taper to posterior. Cephalothorax rectangular. Last abdominal segment cleft without anal operculum. Caudal ramus longer than broad with 2 developed setae. Antennule 5-segmented, the last one being the longest with an aesthete. Exopod of antenna 3-segmented. Exopod of mandible short with 3 setae. Maxilliped long and thin. Both rami P.1-P.4 with 3 segments. P.5 with confluent rami, basendopod with 2 inner setae and exopod with 3 outer setae. P.6 in male is a small plate with 2 setae.

Measurements: Length 0.4mm.

Remarks: The specimens agree fairly well with the original description of the species except for a minor variation in the setal formula. Second segment of endopod of P.2-P.4 bears two inner setae, instead of the one reported for the type material. This is the first record of the species from Indian Coast.

Habitat: Coarse coralline sand with fine shell gravel and little detritus near low water level, intertidal zone.
Distribution: North Atlantic, Mediterranean, South Carolina (America), Mozambique, Lakshadweep, India, Andaman Islands.

Family HARAPACTIDAE
Genus Harpacticus Milne-Edwards, 1840

101. Harpacticus gracilis Claus

Material examined: 2 ex., Kavaratii, 20.3.83; 1 ex., Kavaratti, 29.1.87; 1 ex., Agatti, 8.2.87.

Diagnostic features: Body linear and cephalosome longer than broad. Caudal ramus wider than long with two well developed setae. Antennule 9-segmented, with an aesthete on fourth segment. Antenna with exopod 2-segmented. Maxilliped prehensile with a terminal claw and the endopod bearing spinules on inner margin. P.1 biramous with 3-segmented exopod and 2-segmented endopod, both the terminal segments of the rami bearing 2 terminal claws. Endopod of P.1 twice longer than exopod. P.2-P.4 with both rami 3-segmented. P.5 biramous, with short endopod bearing 4 setae and elongated exopod bearing 5 setae of unequal length.

Measurements: Length 0.58 mm.

Remarks: This is a cosmopolitan species widely distributed on the world beaches with minor morphological variation. The species is, however, readily distinguished from other members of the genus by the special structure of P.1 and P.5. The species is a new record for the fauna of Lakshadweep.

Habitat: Common inhabitant of algae and grasses in the intertidal zone, lagoon beach.

Distribution: Cosmopolitan.

Family TISBIDAE
Genus Tisbisoma Bozic, 1964

102. Tisbisoma triarticulatum Wells

Material examined: 1 ex., Minicoy, 14.3.83; 2 ex., Minicoy, 16.3.83.

Diagnostic features: Body shape cyclopoid. Anal operculum present and bare. Caudal ramus as long as broad, with 4 terminal setae, the middle two being well developed. Antennule 8-segmented, with an aesthete on fourth and last segments. Exopod of antenna 3-segmented, the terminal segment bearing 3 terminal setae. Exopod of mandible 1-segmented, with 5 plumose setae. Endopod of maxilliped 3-segmented, the third segment bearing 3 terminal setae. P.1 with exopod 2-segmented, the third segment bearing 3 terminal setae. P.1 with exopod 2-segmented and endopod 3-segmented. Both rami of P.2-P.4 are 3-segmented. P.5 with both rami distinct; exopod rectangular with 3 terminal setae and basendopod with spinules at base of outer seta. P.6 in male reduced to a single seta.

Measurements: Length 0.3 mm and maximum width 0.18 mm.

Remarks: The specimens examined agreed fairly well with the original description.
of the species. However, an inner seta occurs on the first endopod segment of P.1, overlooked by Wells (1967). Further, the hyaline frill of the abdominal segments is also minutely denticulate. This is the first record of the species from Lakshadweep.

**Habitat** : Coarse and medium coralline sand with little detritus between low and mid-water levels, intertidal zone, lagoon beach.

**Distribution** : Mozambique (Inhaca Island), Lakshadweep, Andamans.

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103. Porcellidium ravanae Thompson and Scott


**Material examined** : 1 ex., Kavaratti, 3.7.87; 1 ex., Kalpeni, 13.2.87.

**Diagnostic features** : Body ovate. Caudal ramus elongate, with 2 dorsal and 4 apical setae. Body ornamentation with circular markings. Rostrum broadly truncate. Antennule 6-segmented and highly setose. Exopod of antenna is of one segment with 3 lateral and 3 apical spineose setae. Endopod of mandible with curiously shaped plumose spines. Endopod of maxilliped with 4 short claws. Endopod of P.1 is 2-segmented, first segment being lamelliform. Rami of P.2-P.4 are 3-segmented. Exopod of P.5 is a triangular lamella with 2 plumose setae in female and 5 plumose setae in male on the outer edge.

**Measurements** : Length 0.6mm and width 0.4mm.

**Remarks** : Despite the incomplete original description of the species made by Thompson and Scott, the present specimens closely agree with it in the structure caudal ramus and fifth leg. Thus, the material examined is very close to *P. ravanae* more than any other species of the genus hitherto known. This is the first record of the species from Lakshadweep.

**Habitat** : Fine coralline sediment from algal thalli near low water level, lagoon beach.

**Distribution** : Sri Lanka, India, Lakshadweep, Andamans.

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104. Peltidium ovale Thompson and Scott


**Material examined** : 2 ex., Minicoy, 11.3.83: 1 ex., Minicoy, 14.3.83.

**Diagnostic features** : Body ovate. Caudal ramus longer than broad with 4 setae. Antennule 7-segmented, with an aesthete on third segment. Antennule is not modified in male, an unusual feature among copepods. Exopod of antenna 2-segmented, the second segment bearing 2 setae. Exopod of mandible single-segmented. Maxilliped prehensile, with a terminal claw. P.1 with exopod 3-segmented and endopod 2-segmented. Last segment of exopod of P.1 is short with 3 terminal claws in male and 2 in female. Endopod of P.1 with a spoon-like modified seta on both the segments. P.2-P.4 with
both rami 3-segmented, with long plumose setae. Exopod of P.5 is an elongate lamina with 5 setae.

**Measurements**: Length 1.5mm and maximum width 0.8mm.

**Remarks**: The species is readily distinguished from all other members of the genus in the body shape, skeleton pattern and the structure of P.1 in both the sexes. The male and female specimens are, however, identical in their organisation except for the structure of P.1 and the absence of P.6 in the female. This species is recorded for the first time from Lakshadweep.

**Habitat**: Coarse coralline sand and littoral algae near low water level, lagoon beach.

**Distribution**: Widely distributed along the coasts of Indian, Pacific and Atlantic Oceans.

105. *Peltidium angulatum* Thompson and Scott


**Material examined**: 2 ex., Androth, 25.2.83; 1 ex., Kavaratti, 7.3.83.

**Diagnostic features**: Body ovate with greatest width at the posterior end of cephalothorax. All segments with acutely pointed epimera. Caudal ramus twice longer than broad with one articulated dorsal seta. Antennule 7-segmented, with an aesthete on third and fourth segments. Exopod of antenna 2-segmented. Endopod of mandible single-segmented with 6 setae. Maxilliped well developed and prehensile with a curved claw. Endopod of P.1 is 2-segmented. Rami of P.2-P.3 are 3-segmented. P.5 with an elongate exopod, bearing 5 setae.

**Measurements**: Length 0.8 mm and maximum width 0.5 mm.

**Remarks**: The material examined conformed well with the original description of the species in all the essential features. This is the first record of the species from Lakshadweep.

**Habitat**: Coarse and detritus coralline sand between low and mid water levels, lagoon beach.

**Distribution**: Sri Lanka, Gulf of Manner, Lakshadweep, Andamans.

106. *Phyllothalestris mysis* (Claus)


**Material examined**: 2 ex., Minicoy, 14.3.83.

**Diagnostic features**: Body linear and slender. Rostrum prominent. Caudal ramus as long as wide with 2 developed apical setae, the inner one being the longest. Antennule 8-segmented, with an aesthete on fourth segment. Antenna robust, with 2-segmented exopod. Maxilliped prehensile with a terminal claw and a row of spinules on the inner margin of endopod. P.1 with 3-segmented exopod and 2-segmented endopod, the second segment of exopod and first segment of endopod being quite long, while the terminal segment bears a pair of apical claws on both the rami. P.2-P.4 with both rami
3-segmented. P.5 is represented by two enlarged foliaceous plates with 4 short inner setae on basendopod and 6 short outer setae on exopod.

**Measurements** : Length 0.8 mm.

**Remarks** : The three known species of the genus *Phyllothalestris*, viz., *P. mysis* (Clas), *P. harringtoni* Willey and *P. sarsi* Sewell closely resemble each other in all the major details of the body armature except for the structure of setae on the female P.5. However, the seta on the basal segment of the exopod of antenna is very well developed in *P. mysis*. Due to considerable morphological variation of the species occurring on different geographical regions, five other species were recently absorbed as its synonyms. The species is recorded for the first time from Lakshadweep.

**Habitat** : Littoral algae and weeds near low water level, intertidal zone, lagoon beach.

**Distribution** : Cosmopolitan and occurs widely distributed on the coasts of the Mediterranean Sea, Atlantic, Pacific and Indian Oceans.

**Genus Rhynchothalestris** Sars, 1905


**Material examined** : 3 ex., Kadmat, 26.1.87; 1 ex., Amini, 28.1.87; 1 ex., Chetlat, 29.1.87.

**Diagnostic features** : Body linear and widest at the posterior margin of cephalothorax. Rostrum large and acutely pointed anteriorly. Abdominal segments 3-4 fringed with minute spinules. Antennule 9-segmented with an aesthete on fourth segment. Exopod of antenna 3-segmented, the median one being quite short with a dorsal seta. Maxilliped prehensile with a terminal claw and a short spine on inner margin of endopod. P.1 with 2-segmented endopod and 3-segmented exopod, the first exopod segment and second endopod segment being the longest. P.2-P.4 with both rami 3-segmented. P.5 with expanded flaps, the basendopod bearing 4 internal setae and the oval exopod bearing 6 outer setae. Endopod of P.2-P.3 modified in male.

**Measurements** : Length 0.8-1.0 mm.

**Remarks** : This species closely resembles with *R. similis* Scott (1909) in all the major details of the body appendages, for which reason the latter species has been synonymised recently with the former species. The species is recorded for the first time from Lakshadweep.

**Habitat** : Littoral algae and weeds near low water level, intertidal zone, lagoon beach.

**Distribution** : The species is almost cosmopolitan in its distribution and is a common inhabitant of the littoral zone along the coasts of Atlantic, Pacific and Indian Oceans.

**Family THALESTRIDAE**

**Genus Diarthrodes** Thompson, 1882


**Material examined** : 1 ex., Chetlat, 29.1.87; 1 ex., Kadmat, 30.1.87.
Diagnostic features: Body fusiform. Rostrum distinct and rounded anteriorly. Caudal ramus broader than long, with spinulose posterior edge and 2 developed setae. Anal operculum lacking. Antennule 6-segmented, with an aesthete on fourth segment, exopod of antenna 3-segmented. Second endopod segment of antenna with geniculate setae. Maxilliped prehensile with a terminal claw. P.1 with both rami 2-segmented. Rami P.2-P.4 with 3 segments, exopod being longer than endopod. P.5 with distinct rami; with both basendopod and exopod with 5 terminal setae. Antennule in male haplocerate. P.6 is a small reduced plate with a pair of alappets.

Measurements: Length 0.6 mm.

Remarks: The species has been described earlier by several workers with considerable morphological variation. The present specimens, however, approach well the description and figures of the species made by Sewell (1940). The species is recorded for the first time from Lakshadweep.

Habitat: Algae and detritus coralline sand between low and mid-water levels, intertidal zone.

Distribution: Atlantic coast of America, Maldives, Lakshadweep, India, Andaman Islands.

Genus Endactylopus Scott, 1909

109. Eudactylopus andrewi Sewell


Material examined: 2 ex., Minicoy, 15.3.83.

Diagnostic features: Body linear, with clear demarcation between metasome and urosome. Rostrum distinct and pointed anteriorly. Caudal furca longer than broad with 2 developed apical setae. Antennule 7-segmented, with an aesthete on fourth segment. Exopod of antenna 2-segmented, the distal one being quite short. Mandible with stout biting ramus and powerful teeth. Maxilliped prehensile, with a terminal claw and a row of spines on inner margin of endopod. P.1 with 2-segmented endopod and 3-segmented exopod. First endopod segment very long and the second one very short. P.2-P.4 with both rami 3-segmented. P.5 with two wide flaps reaching the middle of the fourth abdominal segment. P.6 in male is a short lamina with 4 setae.

Measurements: Length 1.0-1.2 mm.

Remarks: This species having a wide geographical distribution in the Indo-Pacific region showed considerable morphological variation, leading to the formation of some sub-species. But the excellent description of this species made by Ito (1974) put an end to this controversy. The present material conforms well with the description of the species given by Ito, particularly in the absence of the dense cover of spines on abdominal segments. The species is a new record for the fauna of Lakshadweep.

Habitat: Littoral algae and weeds near low water level, intertidal zone, lagoon beach.

Distribution: Maldives, Lakshadweep, India, Sri Lanka, Andaman and Nicobar Islands, Aru Islands, Coroline Islands, Xisha Islands, China and Japan.
Genus  Idomene Lang, 1948

110. Idomene maldivae (Sewell)


*Material examined*: 1 ex., Kadmat, 27.1.87.

*Diagnostic features*: Body dorsoventrally flattened and densely punctate. Rostrum absent. Genital field simple and strongly chitinized. Caudal ramus as long as broad with 2 developed terminal setae. Antennule short and 6-segmented with an aesthete on fourth segment. Exopod of antenna with 2 segments, the first and second segments bearing 2 and 4 setae, respectively. Endopod of mandible with 9 setae. Maxilliped prehensile with a terminal claw. Second endopod segment of P.1 with 2 setae and 2 terminal claws. Rami of P.2–P.3 are 3-segmented and equal in length. All setae and outer spines of the legs are densely plumose. P.5 massive, exopod being longer than broad with 6 setae and endopod with 5 setae.

*Measurements*: Length 0.6 mm.

*Remarks*: Sewell (1940) described the species based on a single female specimen. The single specimen examined from the present collection agreed well with the original description of the species in all the essential features of the body appendages, particularly the structure of P.5. This species is recorded for the first time from Lakshadweep.

*Habitat*: Detritus coralline sand and littoral algae near low water level, lagoon beach.

*Distribution*: Maldives, Lakshadweep, Gulf of Manner, Andamans.

Family  PARASTENHELIIDAE

Genus  Parastenihelia Thompson and Scott, 1903

111. Parastenihelia hornelli Thompson and Scott


*Material examined*: 2 ex., Kavaratti, 6.3.83; 1 ex., Minicoy, 11.3.83; 1 ex., Kalpeni, 13.2.87.


*Measurements*: Length 0.6 mm.

*Remarks*: The material collected from Lakshadweep exhibits some minor variations compared to the original description of the species, particularly in the setal formula. In the circumstances, examination of the material from type locality may throw some light on the validity of these variations. This is the first record of the species from Lakshadweep.
**Habitat**: Detritus coralline sand between low and mid-water levels, intertidal zone, lagoon beach.

**Distribution**: Eurytopic on the coasts of warm temperate and tropical seas.

**Family** DIOSACCIDAE  
**Genus** Diosaccus Boeck, 1872  

112. Diosaccus monardi Sewell  

**Material examined**: 3 ex., Minicoy, 14.3.83.

**Diagnostic features**: Body linear. Marginal spinules occur on ventral surface of three abdominal segments. Rostrum short and broad. Caudal ramus as long as broad, with 1-jointed dorsal seta, a lateral spine and a well developed terminal seta. Antennule 8-segmented, with an aesthete on fourth segment. Exopod of antenna 3-segmented. Exopod of mandible with one lateral and 3 terminal setae; endopod absent. Maxilliped prehensile, with a terminal claw. P.2 in male with 3-segmented exopod and 2-segmented endopod bearing modified setae. Setae on rami P.1-P.4 are highly plumose. P.5 with fused laminae, the endopod bearing 3 setae and exopod 4 setae. P.6 in male is a single plate with 2 setae and a long spine. Principal apical seta of caudal ramus in male is not modified at its base.

**Measurements**: Length 0.8-0.85 mm.

**Remarks**: The original description of the species was made based on a single female specimen. The material examined agreed well with the original description, particularly in the short endopod of P.1, which is a unique feature of the species in the genus. This species is recorded for the first time from Lakshadweep.

**Habitat**: Detritus coralline sand 5 cm below surface near low water level, lagoon beach.

**Distribution**: Nicobar Islands, Gulf of Manaar, Lakshadweep.

**Family** DIOSACCIDAE  
**Genus** Stenhelia Boeck, 1864  

113. Stenhelia polluta Monard  

**Material examined**: 2 ex., Minicoy, 15.3.83.

**Diagnostic features**: Body elongate. Anterior region robust and posterior region narrow. Rows of spinules occur on female abdomen. Antennule 8-segmented. Exopod of antenna 3-segmented. Caudal ramus twice longer than wide. Exopod of P.1 with 3 segments and endopod with 2 segments. Endopod of P.1 as long as exopod. Basal segment of P.5 with 3 setae, while the distal exopod has 5 setae. Caudal ramus thrice longer than wide with 2 developed apical setae, the inner one being the longest. Caudal ramus and P.5 in female are quite variable in this species.

**Measurements**: Length 0.5 mm.

**Remarks**: The present specimens agree fairly well with the original description of the species, particularly in possessing rows of spinules on the female abdomen and the
shape of caudal ramus, which showed considerable variation in the material reported from different geographical regions. This is the first record of the species from Lakshadweep.

Habitat: Algae and fine detritus coralline sand near low water level, intertidal zone.

Distribution: Widely distributed along the coasts of warm temperate and tropical seas.

114. Stenhelia madrasensis Wells

Material examined: 2 ex., Androth, 25.2.83.

Diagnostic features: Body elongate and pyriform. Rostrum large and triangular with bifid apex. Antennule 8-segmented and highly setose, with an aesthete on the fourth segment. Exopod of antenna 3-segmented. Maxilliped non-prehensile, with endopod with 2 segments. Endopod of P.1 is 2-segmented and P.2-P.4 is 3-segmented. Endopod of P.2 with 2 segments in male and 3 segments in female. Exopod P.5 elongate and oval, with 6 terminal setae. Basendopod not expanded, with 5 setae and spines. Genital segment wider in the anterior part than the posterior. Caudal rami 4 times longer than broad, with 2 developed terminal setae.

Measurements: 0.4 mm.

Remarks: The specimens agree well with the original description of the species except for a variation in the structure of antennule and maxilliped. The antennule in the local forms has 8 segments compared to the 7 segments described for the type material. The endopod of maxilliped in the Androth specimens has 2 segments, while it was reported as one for the type specimens. This is the first record of the species from Lakshadweep.

Habitat: Fine coralline sand and algae near low water level, sheltered lagoon beach.

Distribution: East coast of India, Andaman Islands, Lakshadweep.

Genus Robertsonia Brady, 1880

115. Robertsonia proprinqua (Scott)

Material examined: 2 ex., Kadmat, 27.1.87; 1 ex., Chetlat, 29.1.87; 1 ex., Kavaratti, 4.2.87.


Measurements: Length 0.8-0.9 mm.

Remarks: This species has been studied by several zoologists and reported from different geographical regions with considerable morphological variation of its body appendages. As all these workers agree well in major morphological features of the
species, these differences for the present are to be treated as local variations. This is the first record of the species from Lakshadweep.

**Habitat**: Detritus coralline sand and algae near low water level, lagoon beach under sheltered conditions.

**Distribution**: Widely distributed along the coasts of warm temperate and tropical seas.

116. **Robertsonia adduensis** (Sewell)


*Material examined*: 1 ex., Kavaratti, 20.2.83; 1 ex., Androth, 24.2.83.

**Diagnostic features**: Body linear with distinct demarcation between metasome and urosome. Caudal ramus twice as broad as long with the principal apical seta short and expanded at the base. Antennule 6-segmented. Exopod of antenna 3-segmented. Mandible with 1-segmented exopod bearing 2 lateral and 2 terminal setae. Maxilliped prehensile; endopod with a terminal claw. First endopod of P.1 is longer than the entire exopod. Both rami of P.2 in female is 3-segmented, bearing highly plumose setae. P.2 in male with 3-segmented exopod and 2-segmented endopod, bearing highly modified setae. Inner seta absent on the first endopod segment of P.2-P.4. P.5 with endopod bearing 2 stout terminal setae and exopod with 6 setae and spines. P.6 in male bears a long seta flanked by a short plumose spine.

**Measurements**: Length 0.65 – 0.85 mm.

**Remarks**: The specimens examined agreed well with the original description of the species in all the essential features of the body appendages except for the principal apical seta of the caudal ramus, which was reported as normal. This species is recorded for the first time from Lakshadweep.

**Habitat**: Coarse and detritus coralline sand near low water level, lagoon beach.

**Distribution**: Maldives, Lakshadweep, Gulf of Manaar, Andamans.

Genus **Amphiascoides** Nicholls, 1941

117. **Amphiascoides subdebilis** (Willey)


*Material examined*: 1 ex., Agatti, 8.2.87; 1 ex., Bangaram, 10.2.87.

**Diagnostic features**: Body linear and tapers from anterior to posterior, with distinct demarcation between metasome and urosome. Rostrum distinct and elongated. Abdominal ornamentation lacking. Anal operculum present and bare. Caudal ramus thrice as wide as long, with 2 developed terminal setae, the inner one being the longest. Antennule 8-segmented, the fourth segment being quite elongated and bearing an aesthete. Exopod of antenna 3-segmented, the middle segment being very short and the terminal segment bearing 2 apical setae of unequal length. Maxilliped prehensile with a terminal claw. P.1–P.4 biramous, with 3-segmented exopod and endopod. Endopod of P.1 quite stout, first segment being very long and second segment very short. Middle exopod segment without an inner seta. Distal endopod segment of P.3 and distal exopod segment of P.4 with 2 inner setae. P.5 distinctly biramous, with the triangular basendopod and the elongated exopod bearing 5 setae each.
Measurements: Length 0.8 mm.

Remarks: The specimens collected from Lakshadweep conform well with the original description of the species, with a minor variation of setation of the body appendages. This species reported from different geographical regions is, however, known to exhibit considerable morphological variability. This is the first record of the species from Lakshadweep.

Habitat: Algae and detritus coralline sand near low water level, intertidal zone.

Distribution: Cosmopolitan.

Genus Amphiascopsis Lang, 1940

118. Amphiascopsis cinctus (Claus)


Material examined: 3 ex., Minicoy, 11.3.83; 1 ex., Minicoy, 15.3.83.

Diagnostic features: Body linear and slightly tapers posteriorly. Rostrum prominent and pointed anteriorly. Caudal ramus as long as broad with 2 developed setae. Antennule 8-segmented with an aesthete on fourth segment. Exopod of antenna 3-segmented, the middle one being very short. Maxilliped prehensile with a terminal claw and a seta on inner border of the endopod. P.1-P.4 with both rami 3-segmented. Basal segment of P.1 in male with a long spine. Endopod of P.2 in male modified. P.5 in female biramous with 5 inner setae on basendopod and 6 outer setae on exopod. P.5 in male with 2 inner setae on basendopod and 6 outer setae on exopod. P.6 in male is represented by 3 setae.

Measurements: Length 0.8–1.0 mm.

Remarks: This eurytopic species reported from different geographical regions is known to exhibit minor morphological variation of ornamentation and the setae on abdominal appendages. All these varieties ultimately proved to belong to the same species. The species is a new record for the fauna of Lakshadweep.

Habitat: Littoral algae and weeds near low water level, intertidal zone, lagoon beach.

Distribution: Cosmopolitan, occurring widely distributed on the coasts of Indian, Pacific and Atlantic Oceans.

Genus Metamphiascopsis Lang, 1949

119. Metamphiascopsis nicobaricus (Sewell)


Material examined: 2 ex., Kavaratii, 3.2.87; 1 ex., Kalpeni, 13.2.87.

Diagnostic features: Body linear, with distinct demarcation between metasome and urosome. Rostrum distinct, triangular and pointed anteriorly. Caudal ramus broader than long with 2 developed setae. Antennule 9-segmented, with an aesthete on fourth segment. Exopod of antenna 3-segmented, the middle one being quite short. Maxilliped with a terminal claw and a row of needle-like setae on inner margin of endopod. P.1 with 3-segmented exopod and 2-segmented endopod, the first segment being very long, while the second segment being very short, with 2 terminal claws. P.2–P.4 with both rami 3-segmented. P.5 with basendopod bearing 5-setae and the oval distal segment
with 6 setae. Endopod of P.2 in male modified. P.6 in male with one spine and 2 setae.

**Measurements**: Length 0.8–1.0 mm.

**Remarks**: The material examined conforms well with the original description of species, particularly in the presence of only 2 inner setae on the third exopod segment of P.4, which is an important diagnostic character of the species. The species is recorded for the first time from Lakshadweep.

**Habitat**: Intertidal algae and weeds, lagoon beach.

**Distribution**: Widely distributed on the coasts of Indian Ocean as Maldives, Lakshadweep, India, Andaman and Nicobar Islands.

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**Genus Haloschizopera Lang, 1948**


**Material examined**: 2 ex., Minicoy, 14.3.83.

**Diagnostic features**: Body linear and cylindrical, without demarcation between metasome and urosome. Caudal rami are wider than long with two well developed terminal setae. Antennule 8-segmented, with an aesthete on fourth and terminal segments. Exopod of antenna 3-segmented. Exopod of mandible is much reduced and 2-segmented. Maxilliped prehensile upon first segment. Both rami of P.1–P.4 are 3-segmented. Exopod of P.5 rectangular with 5 setae; basendopod with 2 inner, 2 outer and 2 terminal setae.

**Measurements**: Length 0.38–0.42 mm.

**Remarks**: The morphology of the body appendages of the material examined agrees well with the original description of the species. The local specimens are, however, slightly longer in their size. The male specimens still remain unknown. This is the first record of the species from Indian coast.

**Habitat**: Coarse and medium coralline sand with little detritus 5 cm below surface near half-tide level, lagoon beach.

**Distribution**: Red Sea, Lakshadweep.

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**Family METIDAE**

**Genus Metis Philippi, 1840.**


**Material examined**: 1 ex., Minicoy, 14.3.83; 1 ex., Kalpeni, 13.2.87; 2 ex., Kavaratti, 15.2.87.

**Diagnostic features**: Body pyriform, anteriorly robust and posteriorly tapers to furcal rami. Rostrum triangular. Posterolateral margin of 2–4 abdominal segments fringed with spinules. Caudal ramus with 2 developed setae, the inner one being 4 times longer than the outer. Antennule 5-segmented, with an aesthete on second segment. Exopod of antenna is lacking. P.1 with 2-segmented endopod, the terminal segment bearing 2 apical setae. Exopod of P.1 is 3-segmented, the last segment bearing 4 apical setae. P.2–P.4 with both rami 3-segmented. P.5 in female with both rami united, each
with a lateral seta and a terminal spine. P.5 in male distinct and modified. P.6 in male is a plate with a lateral seta.

**Measurements**: Length 0.50–0.56 mm.

**Remarks**: This virtually cosmopolitan species is known to exhibit considerable morphological variation, particularly in the ornamentation of abdominal segments and the setae on abdominal appendages. The present specimens, however, closely conform with the description of the species given by Sewell (1940). The species is recorded for the first time from Lakshadweep.

**Habitat**: Littoral algae and weeds near low water level, intertidal zone, lagoon beach.

**Distribution**: Cosmopolitan.

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**Family** AMEIRIDAE

**Genus** Ameira Boeck, 1864

122. *Ameira parvula* (Claus)


**Material examined**: 3 ex., Minicoy, 16.3.83; 1 ex., Kavaratti, 21.3.83.

**Diagnostic features**: Body linear and cylindrical. Rostrum distinct and pointed anteriorly. Antennule 8-segmented, with an aesthete on fourth segment. Exopod of antenna 2-segmented. Maxilliped prehensile upon first segment. Basis of endopod of P.1 longer than second and third segments together. P.1–P.4 with both rami 3-segmented. Middle segment of exopod of P.2 with one inner seta. Third exopod segment of P.4 with 3 inner setae. P.5 distinctly biramous, basal segment with 4 setae and distal segment with 5 setae. Caudal rami rectangular and as wide as long, with 2 developed setae. P.1 in male with a modified inner spine on basipod. P.6 in male represented by 3 setae.

**Measurements**: Length 0.5–0.6 mm.

**Remarks**: Great morphological variation has been reported for this widely distributed species. The present material, however, approaches well in all the morphological details with the original description of the species.

**Habitat**: Algae and detritus coralline sand near low water level, intertidal zone, lagoon beach.

**Distribution**: Cosmopolitan.

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**Genus** Sicameira Klie, 1950

123. *Sicameira langi* Rao


**Material examined**: 1 ex., Kavaratti, 7.3.83; 1 ex., Kavaratti, 4.2.87.

**Diagnostic features**: Body cylindrical without demarcation between metasome and urosome and slightly tapers posteriorly. Distinct somatic ornamentation lacking. Anal operculum bare. Caudal ramus twice longer than broad, with 3 setae, the middle one being very long. Rostrum small and pointed. Cephalothorax rectangular. Antennule 7-segmented with an aesthete on fourth segment. Exopod of antenna 2-segmented, the
distal one being quite small with 2 long setae. Mandible lacks exopod. Maxilliped prehensile with a terminal claw. Both the rami of P.1–P.4 are 3-segmented. P.5 biramous with distinct rami, the basendopod bearing 2 inner setae and oval exopod bearing 5 setae, the second innermost one being the longest and plumose.

**Measurements**: Length 0.52 mm.

**Remarks**: The Lakshadweep specimens agree well with the original description of the species which was based on female specimens. The male specimens, however, remain unknown.

**Habitat**: Coarse and medium coralline sands with fine shell gravel and little detritus between low and half-tide levels, intertidal zone.

**Distribution**: Indian coast, Lakshadweep, Andaman Islands.

**Genus** Nitocra Boeck, 1864

124. Nitocra affinis rijekana Petkovski


**Material examined**: 2 ex., Androth, 24.2.83; 1 ex., Kavaratti, 6.3.83.

**Diagnostic features**: Body linear. Rostrum small. Anal operculum present with marginal spinules. Caudal ramus wider than long, with 2 well developed terminal setae. Antennule 8-segmented, with an aesthete on fourth segment. Exopod of antenna single-segmented, with 2 setae and an apical spine. Exopod of mandible lacking. Both rami of P.1–P.4 with 3-segments. Exopod of P.5 with 6 setae and basendopod with one outer and 5 inner setae. Male with modified spine on basal segment of P.1. P.6 in male is represented by 3 short setae. Abdominal ornamentation indistinct.

**Measurements**: Length 0.52-0.58 mm.

**Remarks**: The subspecies has been reported with minor variation from different geographical regions. The local forms, however, conform well with the description of the species made from the Atlantic coast (Noodt, 1958). The subspecies is a new record for the fauna of Lakshadweep.

**Habitat**: Coarse coralline detritus sand near low water level, intertidal zone, lagoon beach.

**Distribution**: Eurytopic on the coasts of tropical and warm temperate seas.

**Genus** Paraleptomesochra Wells, 1967

125. Paraleptomesochra minima Wells


**Material examined**: 2 ex., Kavaratti, 7.3.83; 1 ex., Minicoy, 15.3.83; 1 ex., Kavaratti, 20.3.83.

**Diagnostic features**: Body linear and cylindrical, without a taper from anterior to posterior. Rostrum confluent with cephalothorax and sharply pointed anteriorly. Anal operculum present without setules. Somatic ornamentation lacking. Caudal ramus longer than broad with 2 developed terminal setae. Antennule 8-segmented, second segment longest and with an aesthete on fourth and terminal segments. Exopod of antenna 2-segmented, with a modified bifid terminal seta. Mandible exopod absent.
Maxilliped prehensile, with a terminal claw. P.1 with both rami 2-segmented, first endopod segment being as long as exopod. Basis in male with a modified inner spine. P.2–P.4 with both rami 3-segmented with reduced setation. P.5 with distinct rami, exopod being longer than broad with 6 setae in female and 4 setae in male. P.6 in male confluent both sides with 2 setae on either side.

**Measurements**: Length 0.28–0.30 mm.

**Remarks**: Rao (1972) described *P. wellsi*, the only other species of the genus from the beach sands on Waltair coast. Although *P. minima* and *P. wellsi* are closely related, the Lakshadweep specimens agree fairly well with the former species described from Mozambique, which is in fact geographically more distant than the adjacent Indian coast.

**Habitat**: Clean and medium coralline sand 5 cm below surface between low and mid-water levels, intertidal zone, lagoon beach.

**Distribution**: Inhaca Island (Mozambique), Lakshadweep, Andaman Islands.

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**Genus** Parapseudoleptomesochra **Lang, 1965**


**Material examined**: 2 ex., Androth, 24.2.83; 1 ex., Kalpeni, 13.2.87.

**Diagnostic features**: Body linear without demarcation between metasome and urosome. Rostrum minute. Antennule 7-segmented with an aesthete on fourth and terminal segments. Exopod of antenna one-segmented. Mandible without exopod. Maxilliped with a terminal claw and prehensile on endopod. Both rami of P.1–P.4 are 3-segmented. Endopod of P.1 prehensile. Middle segment of exopod of P.1 without inner seta. Exopod of P.5 in female with 5 setae and basendopod with 3 inner setae. Exopod of P.5 in male with 3 setae and basendopod with one seta. P.6 in male is a semicircular lappet with 3 setae. Caudal ramus longer than wide with one lateral and 2 well developed terminal setae.

**Measurements**: Length 0.32–0.35 mm.

**Remarks**: The material examined corresponds well with the description of the type species with some variations in the smaller body size, position of aesthete on antennule, 1-segmented exopod of antenna and the exopod of P.5 with five setae. In the absence of a comparison with type material which is not available for study, it would be difficult to comment on this morphological variation. This species is recorded for the first time from Lakshadweep.

**Habitat**: Medium and coarse coralline sand between low and high water levels, intertidal zone, lagoon beach.

**Distribution**: Indian coast, Andaman Islands, Lakshadweep.

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**Family** Paramesochridae

**Genus** *Kliopsyllus* Kunz, 1962


**Material examined**: 2 ex., Amini, 28.1.87; 2 ex., Kadmat, 30.1.87; 1 ex., Kavaratti, 2.2.87.
Diagnostic features: Body depressed dorsoventrally and tapers posteriorly. Antennule 7-segmented with an aesthete on the fourth and terminal segments. Exopod of antenna single-segmented with 3 setae. Rami of P.1 are 2-segmented, the second segment of endopod with 2 setae and exopod with 4 setae. P.2–P.4 with one-segmented endopod and 3-segmented exopod. Exopod of P.5 with 3 setae. P.6 in male is represented by 3 short setae. Caudal rami thrice longer than wide, with 3 terminal setae.

Measurements: Length 0.28–0.30 mm.

Remarks: The specimens correspond with the original description of the female with a few variations. The antennule bears a terminal aesthete not reported for the type specimens. The terminal exopod segment of P.2–P.3 also bears a pectinate seta in the Lakshadweep specimens, a feature not described for the Madras specimens.

Habitat: Medium coralline sand with little detritus between low and high water levels, intertidal zone.

Distribution: India, Andaman Islands, Lakshadweep.
3-segmented exopod, both rami ending in 1 and 3 setae, respectively. P.5 with oval exopod bearing 3 apical setae. P.6 in male a small plate with 2 apical setae.

**Measurements** : Length 0.28–0.32mm.

**Remarks** : Among the known species of the genus *Kliopsyllus*, in the structure of the body appendages and their setation, the material examined closely approaches *K. idiotes* Wells (1967) described from the sandy beaches of the Inhaca Island, Mozambique. But, considerable variation of the setation of P.1–P.5 occurs in the local specimens, making their identity with the South African species difficult.

**Habitat** : Clean and medium coralline sand between low and mid-water levels, intertidal zone, lagoon beach.


**Material examined** : 2 ex., Kalpeni, 13.2.87.

**Diagnostic features** : Body elongate, cylindrical, about 7 times as long as broad. Thoracic segments 3-5 without distinct demarcation. Caudal rami sub-pyriform. Antennule 7-segmented with an aesthete on the fourth segment. Exopod of antenna 1-segmented with 2 lateral setae and a modified terminal seta. Exopod of P.1 is 1-segmented with one lateral and 4 terminal setae. Endopod of P.1 is 2-segmented, the second segment being small with 2 terminal setae. P.2–P.4 with 3-segmented exopod; endopod lacking. Exopod of P.5 with 4 setae. P.6 on either side fused, with 2 setae on each side.

**Measurements** : Length 0.3mm.

**Remarks** : This species described from Porto Novo is very close to *A. depressus* Krishnaswamy (1957) described from Madras, except for a minor variation in the setation of the exopod of P.5. The present specimens otherwise agree well with both these species. Hence, the validity of *A. depressus* needs to be ascertained due to the non-availability of its type material (Wells, 1971).

**Habitat** : Coarse and medium coralline sand with little detritus, intertidal zone, lagoon beach.

**Distribution** : India, Andamans Islands, Lakshadweep.


**Material examined** : 1 ex., Kadmat, 30.1.87; 1 ex., Kavaratti, 3.2.87.

Measurements: Length 0.28–3.0mm.

Remarks: Despite the wide geographical distribution of this species, the morphological details of body appendages in the local specimens agree fairly well with the original description of the species from the Australian coast. This species is a new record for the fauna of Lakshadweep.

Habitat: Coarse and medium coralline sand between low and mid-water levels, intertidal zone, lagoon beach.

Distribution: Widely distributed along the coasts of Indian and Pacific Oceans.

Family TETRAGONICIPITIDAE
Genus Phyllopodopsyllus Scott, 1906

132. Phyllopodopsyllus aegypticus Nicholls

Material examined: 3 ex., Agatti, 7.2.87; 2 ex., Agatti, 9.2.87; 1 ex., Bangaram, 10.2.87; 1 ex., Agatti, 11.2.87.

Diagnostic features: Body linear about 5 times as long as broad and densely covered with fine hairs. Anal operculum setose. Genital suture complete dorsally. Caudal ramus longer than wide, with the principal terminal seta being not bulbous. Antennule 7-segmented in female and 6-segmented in male, with an aesthete on fourth segment. Exopod of antenna 1-segmented and bears 3 setae. Exopod of mandible small and 1-segmented. Maxilliped with a terminal claw. Rami of P.1-P.4 with 3-segmented exopod and 2-segmented endopod. First endopod segment of P.1 is elongate, slender, 7 times as long as broad and 7 times as long as the second segment. Exopod of P.5 with 5 setae, 2 of them being stout and plumose. P.6 in male with 2 setae and an outer spine.

Measurements: Length 0.76 mm.

Remarks: The specimens examined agreed well with the original description of the species, except for the presence of an extra seta on the distal segment of P.4. The peculiar rostrum, mouth parts, exopod of P.3 and female P.5 are important characteristic features of the species. This species is recorded for the first time from Indian coast.

Habitat: Coarse coralline sand with little detritus 5 cm below surface between low and mid-tide levels, intertidal zone.

Distribution: Red Sea, Lakshadweep, Andamans.

Family CANTHOCAMPTIDAE
Genus Mesochra Boeck, 1864

133. Mesochra pygmaea (Claus)
1863. Dactylopus pygmaea Claus, Die freilebenden Copepoden der Fauna Deutschlands, 127.

Material examined: 1 ex., Agatti, 8.2.87; 2 ex., Kalpeni, 13.2.87.

Diagnostic features: Body linear without distinct demarcation between metasome and urosome. Antennule 6-segmented. Exopod of antenna 1-segmented. Rostrum distinct, long and slender. Maxilliped prehensile with a terminal claw and spinules on inner margin of endopod. P.1 biramous with endopod 3-segmented, basis being longer than whole exopod. P.2–P.4 biramous with 2-segmented endopod and 3-segmented
exopod. P.5 with 2 segments, the basal and distal segments bearing 5 setae each. Anal operculum covered with fine setules. Caudal ramus not longer than wide, a developed terminal seta present. Abdominal ornamentation lacking.

*Measurements*: Length 0.42 mm.

*Remarks*: The specimens examined correspond well with the original description of the species, but for the minor variation of setules on anal operculum. The species is recorded for the first time from Lakshadweep.

*Habitat*: Algae and detritus coralline sand near low water level, intertidal zone, lagoon beach.

*Distribution*: Cosmopolitan.

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**Family CYLINDROPSYLLIDAE**

**Genus Leptastacus Scott, 1906**


*Material examined*: 2 ex., Gopalpur, 27.1.77.

*Diagnostic features*: Body cylindrical without demarcation between metasome and urosome. Rostrum short and elliptical. Caudal ramus about 3 times longer than broad, with one terminal stout pectinate seta and 3 lateral slender setae. Antennule 7-segmented, with an aesthete on the fourth segment. Exopod of antenna one-segmented with 2 terminal setae. P.1-P.4 with 3-segmented exopod and 2-segmented endopod. Terminal segments of exopod and endopod of P.1 with 2 geniculate setae each. Third exopod segment of P.3 and second and third exopod segments of P.4 with a modified seta each. P.5 is a triangular lamina with 4 setae in female and 3 setae in male. P.6 is a small semicircular lappet with 2 terminal setae.

*Measurements*: Length 0.36 mm.

*Remarks*: The specimens agree well with the original description of the species made from Andhra coast. This is the first record of the species from Lakshadweep.

*Habitat*: Medium sand with little detritus between low and half-tide levels, intertidal zone.

*Distribution*: East coast of India, Lakshadweep.

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**Genus Psammastacus Nicholls, 1935**


*Material examined*: 1 ex., Androth, 22.2.83, 2 ex., Amini, 27.2.83.

*Diagnostic features*: Body cylindrical and vermiciform without demarcation between metasome and urosome. Rostrum small and triangular. Anal operculum with two spinous outgrowths. Caudal rami conical, with a lateral row of spinules, 4 setae and a terminal claw. Antennule 7-segmented, with an aesthete on the fourth segment. Exopod of antenna one-segmented with a terminal seta. Maxilliped with elongated second endopod segment and a claw. P.1 with 1-segmented exopod and 2-segmented endopod. P.2-P.4 with 3-segmented exopods and 2-segmented endopods. Third exopod segment of
P.3 and second and third exopod segments of P.4 bear modified setae. P.5 reduced to a
narrow plate with 4 setae in female and 3 setae in male. P.6 in male is a narrow lappet
with one lateral and one apical seta.

*Measurements*: Length 0.6 mm.

*Remarks*: The specimens agree well with the original description of the species
made from Waltair coast with a minor variation of the spinules on caudal rami. The
species is a new record for the fauna of Lakshadweep.

*Habitat*: Coarse and medium coralline sand with fine shell gravel and little detritus
between low and half-tide, levels intertidal zone, lagoon and seaward beaches.

*Distribution*: India, Lakshadweep, Andaman Islands.

### Genus Arenopontia Kunz, 1937

#### 136. Arenopontia subterranea Kunz


*Material examined*: 1 ex., Kavaratti, 7.3.83; 1 ex., Agatti, 9.2.87.

*Diagnostic features*: Body cylindrical and vermiform without demarcation between
metasome and urosome. Caudal rami twice longer than wide with a terminal spine, 2
lateral and 2 terminal setae. Antennule 6-segmented, with an aesthete on fourth segment.
Exopod of antenna one-segmented with 2 terminal setae. P.1-P.4 are biramous with 3-
segmented exopod and 2-segmented endopod. Second endopod segment short with 2
terminal setae. Maxilliped single segmented, with a terminal claw. Second endopod
segment of P.2 and P.4 with a modified seta. P.5 is a triangular plate with 4 setae. P.6
in male is a semicircular lamina with a short spine and a long seta.

*Measurements*: Length 0.30–0.32 mm.

*Remarks*: The specimens agree in all essential features with the original
description of the species from Kiel Bay. Minor variations, however, occurred in the
armature of the body appendages, particularly the shape of modified setae on the terminal
exopod segment of P.1 and the terminal endopod segment of P.2 and P.4. As the species
is widely distributed, these variations are to be considered local.

*Habitat*: Medium coralline sand with little detritus near mid-water level, intertidal
zone, lagoon beach.

*Distribution*: North Atlantic, Mediterranean, Lakshadweep, India, Andaman
Islands.

#### 137. Arenopontia indica Rao


*Material examined*: 3 ex., Kavaratti; 18.2.83; 1 ex., Amini, 28.1.87; 2 ex.,
Agatti, 8.2.87.

*Diagnostic features*: Body cylindrical without demarcation between metasome and
urosome and worm-like. Anal operculum prominent without setae. Antennule 6-
segmented, the fourth with an aesthete. Exopod of antenna one-segmented with two
terminal setae. Maxillule and maxilla much reduced. Maxilliped short with a terminal
claw. P.1-P.4 are biramous with 3-segmented exopod and 2-segmented endopod. Second
endopod segment short with 2 terminal setae. Second endopod segment of P.2 and P.4
and third exopod segment of P.4 with modified setae. P.5 is a triangular plate with 4 setae. Egg sac single, with 5-9 eggs arranged in 1 or 2 rows. Sixth leg in male is a semicircular lamina with an inner spine and an outer seta. Considerable variability occurs in this species in the structure of caudal ramus and its terminal claw.

**Measurements**: Length 0.52-0.56 mm.

**Remarks**: The specimens examined correspond well with the original description of the species except for the presence of the spur on the inner side of ramus. The spur was reported on the outer side of ramus for the type specimens occurring on the Waltair coast.

**Habitat**: Medium coralline sand with little detritus near mid-water level, intertidal zone, lagoon beach.

**Distribution**: India, Lakshadweep, Andaman Islands.

**Genus Psammopsyllus Nicholls, 1945**

138. *Psammopsyllus operculatus* Nicholls


**Material examined**: 2 ex., Amini, 27.2.83; 1 ex., Amini, 28.1.87; 1 ex., Chetlat, 29.1.87.

**Diagnostic features**: Body linear and cylindrical, without demarcation between metasome and urosome. Anal operculum present. Caudal ramus conical and twice longer than wide. Each ramus bears 2 short terminal spines, 3 lateral and 3 terminal setae. Antennule 6-segmented, with an aesthete on fourth segment. Exopod of antenna lacking. Maxillipede single-segmented, with a terminal claw. P.1 is uniramous with 2-segmented endopod, the second segment being 1/3 of the first with 2 apical setae. P.2-P.3 are biramous, with 3-segmented exopod and 1-segmented endopod; last exopod segment with 3 terminal setae. P.5 is a short semicircular lamina with a spine and a seta.

**Measurements**: Length 0.36 mm.

**Remarks**: The species has a wide geographical distribution occurring on the Pacific, Atlantic and Indian Oceans, exhibiting minor morphological variation compared to the original description, particularly the setation of the body appendages. The material examined, however, was very close to the specimens described from the Australian coast, except for the presence of a modified seta with branched tip on the endopod segment of second leg of the local specimens. The species is recorded for the first time from Lakshadweep.

**Habitat**: Medium coralline sand 10 cm below surface near mid-water level, intertidal zone, lagoon beach.

**Distribution**: Australia, Andamans, India, Lakshadweep, Senegal, Ghana, Brazil.

**Genus Sewellina Krishnaswamy, 1957**

139. *Sewellina reductus* Krishnaswamy


**Material examined**: 1 ex., Androth, 24.2.83; 1 ex., Kiltan, 2.3.83.

**Diagnostic features**: Body cylindrical, vermiform and highly modified. Much reduced
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reduced and filiform appendages. Anal operculum present. Antennule 6-segmented, with an aesthete on the fourth segment. Exopod of antenna 1-segmented and rudimentary, with two apical setae. Maxilliped prehensile with a terminal claw. P.1 uniramous with 3 segments, the terminal segment with 2 geniculate setae. P.2 biramous, with a single-segmented exopod and endopod, each bearing a modified seta. P.5 is reduced to a triangular lamina with 3 setae. Egg sac single with 1 or 2 eggs arranged in a linear row. Caudal ramus three times longer than wide, with a terminal claw, an internal spine, 3 lateral and 3 terminal setae. The well developed terminal seta is about half the length of the body.

Measurements: Length 0.50-0.52 mm.

Remarks: The specimens exhibited a considerable variation compared to the original description of the species from Madras coast in the body size, structure of caudal ramus, antennule, antenna and the setation on P.2-P.4. They, however, correspond well with the variation described for the species by Rao and Ganapati (1969) on Waltair coast. The species is recorded for the first time from Lakshadweep.

Habitat: Medium coralline sand near mid-water level, intertidal zone, lagoon beach.

Distribution: East coast of India, Lakshadweep.

Family CLETODIDAE
Genus Enhydrposoma Boeck, 1872

140. Enhydrposoma littorale Wells


Material examined: 2 ex., Kiltan, 1.3.83; 1 ex., Kiltan, 3.3.83.

Diagnostic features: Body tapers slightly posteriorly. Rostrum confluent with cephalothorax. Anal operculum present. Cuticle punctate. Caudal rami with 3 terminal setae, the median one being the largest. Antennule short and 5-segmented, with an aesthete on third and fifth segments. Exopod of antenna 1-segmented, with 2 plumose setae. Maxilliped with a terminal claw and prehensile upon first segment. P.1-P.4 with exopod 3 segmented and endopod 2-segmented. First segment of endopod P.1 is very small without setae. Second segment 5 times as long as the first, with spinules on outer edge and a terminal seta and a spine. Second segment of endopod P.4 with a massive spine at the outer distal corner. P.5 with distinct rami; exopod with 2 terminal and 2 outer setae. Endopod of P.3 in male is 3-segmented and modified.

Measurements: Length 0.35–0.40 mm.

Remarks: The material examined conforms well with the original description of the species made from Mozambique. The structure of mouth parts, P.5 and the caudal ramus, clearly distinguish the species from other members of the genus. This is the first record of the species from Indian coast.

Habitat: Fine and medium coralline sand with little detritus and algal thalli near low water level, lagoon beach.

Distribution: Mozambique (Inhaca Island), Lakshadweep.
Family LAOPHONTIDAE
Genus Laophonte Philippi, 1840.

141. Laophonte cornuta Philippi

Material examined: 2 ex., Androth, 25.2.83; 1 ex., Kavaratti, 6.3.83.


Measurements: Length 0.62 mm.

Remarks: The species has been described from different geographical regions with considerable morphological variation (Lang, 1965), particularly in the anal operculum and the somatic ornamentation. Although the present specimens conform well with the important characters of the species, variation is, however, observed with the ornamentation, antennule and caudal ramus. Because of the ubiquitous nature of the species, these variations are to be considered local.

Habitat: Algae and detritus coralline sand, between the low and mid-water levels, intertidal zone, lagoon beach.

Distribution: Cosmopolitan.

Genus Quinquelaophonte Wells, Hicks and Coull, 1982

142. Quinquelaophonte quinquespinosa (Sewell)

Material examined: 2 ex., Minicoy, 15.3.83; 2 ex., Kavaratti, 21.3.83.

Diagnostic features: Body linear and slightly compressed dorsoventrally. Anal operculum with a row of small spinules. Caudal rami twice as long as broad with 2 developed terminal setae. Antennule 6-segmented, with an aesthete on the fourth segment. Exopod of antenna is of one small segment with 2 setae. Maxilliped robust, with a stout terminal claw. Endopod of P.1 with 2 segments, prehensile and ends in a terminal claw. P.2–P.4 biramous, with 2-segmented endopod and 3-segmented exopod. Exopod of P.5 with 5–6 setae. P.6 in male is a small lappet with 2 lateral setae.

Measurements: Length 0.60–0.68 mm.

Remarks: The specimens conform well with the original description of the species except for minor variations in abdominal ornamentation and setation of the body appendages. This is a new record of the species from Lakshadweep.

Habitat: Fine coralline sand and algae near low water level, intertidal zone, lagoon beach.

Distribution: Widely distributed along the coasts of Mediterranean Sea, Atlantic, Pacific and Indian Oceans.
Genus Echinolaophonte Lang, 1965

143. Echinolaophonte tropica Ummerkutty


Material examined : 2 ex., Androth, 22.2.83; 1 ex., Androth, 25.2.83.

Diagnostic features : Body broad, five times as long as wide and dorsoventrally compressed. Rostrum broad, truncate and fused with cephalothorax. Caudal ramus less than twice as long as broad with 2 principal setae fused at their base, inner one is much longer than the outer. Cuticle minutely punctate. Antennule short and 6-segmented, with an aesthete on fourth segment. Exopod of antenna well developed, with 4 long setae. Maxilliped large and robust with massive terminal claws. P.1 with 2-segmented exopod and 2-segmented endopod, the first endopod segment being extremely robust. P.2–P.4 with short terminal exopod and endopod segments. P.5 with elongate exopod carrying 3 setae, the inner one being densely plumose. P.6 in male with a small seta and a massive spine.

Measurements : Length 0.65 mm.

Remarks : The specimens examined correspond well with the original description of the species. Among the known species of the genus Echinolaophonte, E. tropica is very distinct in the structure of the body appendages, particularly the P.1 and P.5. This species is recorded for the first time from Lakshadweep.

Habitat : Detritus coralline sand and littoral algae near low water level, lagoon beach.

Distribution : India, Lakshadweep, Andamans.

Order ISOPODA
Family MICROPARASELLIDAE
Genus Angeliera Chappuis and Delamare, 1954

144. Angeliera phreaticola Chappuis and Delamare


Material examined : 2 ex., Kavaratii, 7.3.83; 1 ex., Minicoy, 15.3.83; 1 ex., Agatti, 7.2.87.


Measurements : Length 1.2–1.6 mm.

Remarks : The specimens correspond well in all the essential features with the original description of the species from Madras sea shore. Minor variation of the local forms was, however, observed in the setation of appendages. This species is recorded for the first time from Lakshadweep.
Habitat: Coarse and medium coralline sand with little detritus between low and half-tide levels, intertidal zone, lagoon and seaward beaches.

Distribution: Mediterranean, Madagascar, Lakshadweep, India.

Family ANTHURIDAE
Genus Microcerberus, Karaman, 1933

145. Microberberus predatoris (Gnanamuthu)

Material examined: 3 ex., Kavaratti, 3.2.87; 1 ex., Agatti, 8.2.87; 2 ex., Androth, 24.2.83.


Measurements: Length 1.0–1.2 mm.

Remarks: The specimens agree well with the original description of the species from Madras sea shore. This is the first report of the species from Lakshadweep.

Habitat: Coarse coralline sand with fine shell gravel and little detritus between low and half-tide levels, intertidal zone, lagoon and exposed beaches.

Distribution: Indian coast, Lakshadweep.

146. Microcerberus anfindicus Messana, Argano and Baldari

Material examined: 2 ex., Kavaratti, 7.3.83; 1 ex., Kavaratti, 8.2.87; 2 ex., Agatti, 8.2.87; 1 ex., Bangaram, 10.2.87.

Diagnostic features: Body linear, cylindrical and vermiform, with colourless cephalon and 10 visible segments. Segments II-IV are narrower than the rest. Antennule 10-jointed, with 2 terminal plumose setae on fourth segment. Antenna 6-jointed, with plumose setae on first, second and fourth segments and an aesthete on last segment. Mandible with four teeth. Carpus of each pereiopod with a single plumose seta on the distal edge. Male pleopod II bears an elongate endopodite terminating in a hyaline membrane sustained by a chitinuous structure. Endopod of uropod twice longer than the basis, with four sensory plumose setae. Sluggish in habits.

Measurements: Length 0.8–1.0 mm.

Remarks: The material examined conformed well with the original description of the species made from Maldives, with a minor variation of the setation on the body appendages. The second pleopod of male in M. anfindicus, however, closely resembles that of M. microcerberus (Gnanamuthu, 1954) described from Madras coast. Hence, the validity of these two species needs to be further examined. This is the first record of M. anfindicus from Indian Coast.
Habitat: Coarse coralline sand with little detritus 5 cm below surface near low water level, lagoon beach.

Distribution: Somalia, Maldives, Lakshadweep.

Phylum TARDIGRADA
Order HETEROTARDIGRADA
Suborder ARTHROTARDIGRADA
Family BATILLIPEDIDAE
Genus Batillipes Richters, 1909

147. Batillipes mirus Richters

Material examined: 2 ex., Minicoy, 14.3.87.

Diagnostic features: Body minute, unsegmented, dorsoventrally flattened and nearly rectangular in shape. Head and trunk not clearly demarcated. The head appendages disposed on the anterior border consist of a median cirrus, internal buccal cirrus, external buccal cirrus, clava and lateral cirrus, the last one being the longest. Eyes absent. Cuticle is smooth and transparent. Four pairs of lateral legs are present, each with a slender dorsal spine at the base and 6 digits of different size ending in spoon-shaped adhesive discs. Postero-lateral corners of the body bear a long seta characteristic of the genus. A median caudal spine present. Highly thigmotactic and negatively phototactic in habits.

Measurements: Length 160 μm and width 50 μm.

Remarks: The specimens examined agreed well with the original description of the species except for some minor variation in the body size and the length of the cephalic appendages. This is the first record of the species from Lakshadweep.

Habitat: Fine and medium coralline sand 10 cm below surface near mid water level, intertidal zone, lagoon beach.

Distribution: Cosmopolitan.

Family STYGARCTIDAE
Genus Parastygarctus Renaud-Debyser, 1965

148. Parastygarctus higginsi Renaud-Debyser

Material examined: 1 ex., Minicoy, 14.3.87.

Diagnostic features: Body dorsoventrally flattened and transparent, with external segmentation of the cuticle in the form of dorsal plates. Each plate is drawn laterally into two long acute processes. Head distinct with anterior and paired lateral lobes bearing appendages that consist of a median cirrus, internal buccal cirrus and external buccal cirrus, clava I, lateral cirrus and clava II. All the cirri are 2-jointed. Four pairs of legs are present disposed laterally, each ending in 4 claws, the median pair bearing long sensory bristles. A very long cirrus occurs anterior to the base of the fourth leg, with a ringed
cuticular thickening in the middle. A small papilla occurs between the long cirrus and the fourth leg. Pharyngeal bulb circular with long buccal stylets.

**Measurements**: Length 240 μm and width 60 μm.

**Remarks**: The specimens agree well with the original description of the species made from Madagascar in the Indian Ocean. Minor variations of the morphological features are, however, noticed in the length of the body appendages of the local forms.

**Habitat**: Coarse coralline sand with little detritus below low water level, lagoon beach.

**Distribution**: Madagascar, Lakshadweep, Andamans, Malaysia.

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**149. Halacarus anomalus** Trouessart


**Material examined**: 2 ex., Kavaratti, 3.2.87; 1 ex., Agatti, 7.2.87; 2 ex., Bangaram, 10.2.87.

**Diagnostic features**: Body spindle-shaped, with 2 legs disposed anteriorly and 2 legs posteriorly. Ocular plates absent. Genital plate separate from anal plate and divided into right and left halves. A narrow transverse sclerite separates the genital and the anal plates. Legs I-IV have 6 segments with 2 terminal claws bearing an accessory tooth. Bacillum and parabacillum present on the inner side. Last segment of first leg bears unidentate median claw and 2 pairs of parambulacral setae. Last segment of second, third and fourth legs has a prominent claw fossa and a pair of parambulacral setae. Body well suited for interstitial life.

**Measurements**: Length 0.28–0.32 mm.

**Remarks**: The specimens correspond well with the original description of the species. The local forms are, however, considerably smaller in size, as the European specimens are known to reach up to 0.60 mm in length. The body is linear to suit life between sand grains.

**Habitat**: Coarse and medium coralline sands with little detritus between low and half-tide levels, intertidal zone, lagoon and seaward beaches.

**Distribution**: Widely distributed along the coasts of Mediterranean Sea, Atlantic and Indian Oceans.
150. *Caecum glabrum* (Montagu)


*Material examined*: 1 ex., Androth, 14.3.83.

*Diagnostic features*: Body small with curved tubular shell having well developed external annulation. Small coiled portion of the shell decollated. Animal lies in the distal uncoiled portion of the shell. Shell is closed by a calcareous septum at the proximal end and by a horny multispiral operculum at the distal end. Head distinct with a pair of dark eyes and a pair of ciliated tentacles. Foot with small, operculum attached on the dorsal surface. Body anatomy much reduced to suit interstitial life. Feeds mainly on diatoms.

*Measurements*: Length 0.9 mm.

*Remarks*: The much reduced morphology on the anatomy of *C. glabrum* was studied in detail by Gotze (1938). The present specimen examined conformed well with the description and figures of the species except for the superficial ridges on the shell which might be result of the geographical isolation of the species. This is the first record of the species from Lakshadweep.

*Habitat*: Coarse coralline sand between low and mid-water levels of the intertidal zone, lagoon beach.

*Distribution*: Widely distributed along the coasts of the North Atlantic and the Indian Ocean.

Order **NUDIBRANCHIATA**

Family **PSEUDOVERMIDAE**

Genus **Pseudovermis** Pariaslavzewa, 1891

151. *Pseudovermis indicus* Salvini-Plawen and Rao


*Material examined*: 2 ex., Androth, 23.2.83; 1 ex., Agatti, 7.2.87.

*Diagnostic features*: Body elongate and vermiform with 10 large asymmetrically arranged cerata. Head ovoid. Eyes absent. Foot-sole indistinct. Radula with 30 transverse rows of plates, middle plate with 9 denticles. Lateral teeth one-pointed. Jaws with 15 denticles on the anterior border. Nematocysts are few, stenotele-type and irregularly scattered. Epidermal glands richly represented and the species is highly thigmotactic. Distance between cerata I and II is shorter than between cerata II and III. Body white and highly contractile.

*Measurements*: Length 2.4–2.8 mm.

*Remarks*: The specimens agree well with the original description of the species made from the Waltair coast. The species is recorded for the first time from Lakshadweep.

*Habitat*: Coarse coralline sand with fine shell gravel and little detritus 5–10 cm below surface near low-water level, intertidal zone.

*Distribution*: India, Lakshadweep, Andaman Islands.
RAO: Meiofauna

Order ACOCHLIDIACEA
Family MICROHEDYLIDAE
Genus Microbedyle Hertling, 1930

152. Microbedyle sp.

Material examined: 2 ex., Androth, 22.2.83; 1 ex., Androth, 25.2.83.

Description: Body elongate, cylindrical, highly contractile and adhesive. Dermis without epidermal spicules. Head bears 2 linear labial tentacles, 2 thick palps or rhinophores and 2 small dark eye spots. Anterior 2/5 of the body is linear, while the rest of the posterior comprises of long and robust visceral mass. A ventral finger-like foot present. Radula apparatus consists of 26–30 transverse rows of plates, with serrated median and pointed lateral teeth. Sexes separate. Penis absent. No vas deferens. Digestive gland without a loop. External shell absent.

Measurements: Length 2.5–2.8 mm.

Remarks: In the structure of external features, the specimens examined closely approach Microhedyle gerlachi Marcus and Marcus (1959) described from Maldives in the Indian Ocean. Specific identification of the present material, however, needs a further detailed study.

Habitat: Coarse coralline sand with fine shell gravel and little detritus near low water level, intertidal zone, lagoon beach.

REMARKS ON DISTRIBUTION

Due to the characteristic topography of these islands with a steep slope on the eastern side and shallow water lagoons on the western side, the physiography of these beaches is also quite different on both the sides. Accordingly, the seaward beaches on the eastern side are quite steep, narrow and exposed to severe wave action with the presence of limited sandy patches and numerous coarser elements as gravel, pebbles, rocks and boulders. On the other hand, the lagoon beaches on the western side are mostly sheltered, extensive and sandy with the occasional concentrations of seaweeds. The lagoon beach sands are mostly well sorted and the particle shape varies from subspherical to spherical. Compactness of these sands is considerably low due to the coralline nature of the sediment. The texture of the substrate varies from fine sand to coarse gravel. The lagoon sands are exclusively composed of calcium carbonate, with very little silica. The sands are mostly poor in decayed organic detritus. The ambient tropical and oceanic conditions of temperature and salinity mostly prevail in these sandy beaches.

The majority of meiofaunal groups characteristic of the intertidal sandy sediments are encountered on these islands. But the faunal composition and their abundance varied considerably at different tidal levels, habitats and localities of these islands, depending on the nature of the substratum. The sheltered situations of the lagoon side with greater beach stability generally supported the richest animal populations, while the exposed areas with frequent disturbance of the habitat on storm beaches yielded their poor collections. Sands samples collected from lower and subtidal levels of the lagoon beaches which are less exposed to desiccation during low tide yielded greater number of the individuals. The highest meiofaunal diversity on these atolls, however, occurred in
the intertidal zone, while the subtidal levels showed a reduced meiobenthic diversity and a preponderance of individuals. Similarly, the marine algae and sea grasses in the lower levels yielded more number of individuals than those occurring on the higher tidal levels. The total population values of meiofauna recorded in these littoral sediments up to a depth of 30 cm below surface ranged from 340 to 2680 individuals per 10 cm² of the substratum. These results closely conform with the densities recorded on similar global areas (Rao & Misra, 1983). Maximum concentration of the fauna on these intertidal habitats occurred 10–15 cm below surface near mid-water level, the lower levels generally supporting higher densities of the fauna than the higher levels. Vertically, their spatial distribution is largely restricted to the top layers of the sediment and is very much influenced by the availability of dissolved oxygen in interstitial water.

The majority of meiofaunal groups characteristic of intertidal sand and algae in other parts of the world are encountered on these islands. Among them, both qualitatively and quantitatively, the free-living nematodes, annelids and copepods constituted the major groups comprising 70 to 80% of the total fauna (Table 1). The turbellarians, gastrotrichs and amphipods were next in importance, while the remaining groups as protozoan ciliates, hydrozoans, nemertines, kinorhynchs, ostracods, isopods, cumaceans, insect larvae, salt-water mites, tardigrades and molluscs occurred in much smaller numbers. The coarse sandy sediments, however, supported greater diversity of the meiofauna compared to the fine or the algal substrata. The nematodes always formed a

<table>
<thead>
<tr>
<th>Group</th>
<th>Sand</th>
<th>Algae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrozoa</td>
<td>0.2</td>
<td>–</td>
</tr>
<tr>
<td>Turbellaria</td>
<td>6.3</td>
<td>4.0</td>
</tr>
<tr>
<td>Nematoda</td>
<td>30.4</td>
<td>34.8</td>
</tr>
<tr>
<td>Nemertina</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Gastrotricha</td>
<td>6.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Kinorhyncha</td>
<td>0.2</td>
<td>–</td>
</tr>
<tr>
<td>Archiannelida</td>
<td>7.4</td>
<td>–</td>
</tr>
<tr>
<td>Polychaeta</td>
<td>10.6</td>
<td>8.3</td>
</tr>
<tr>
<td>Oligochaeta</td>
<td>1.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Ostracoda</td>
<td>2.0</td>
<td>3.6</td>
</tr>
<tr>
<td>Copepoda</td>
<td>25.8</td>
<td>22.5</td>
</tr>
<tr>
<td>Isopoda</td>
<td>2.2</td>
<td>4.0</td>
</tr>
<tr>
<td>Amphipoda</td>
<td>1.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Cumaceae</td>
<td>0.5</td>
<td>0.3</td>
</tr>
<tr>
<td>Insect larvae</td>
<td>1.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Halacarida</td>
<td>1.1</td>
<td>2.8</td>
</tr>
<tr>
<td>Tardigrada</td>
<td>0.3</td>
<td>–</td>
</tr>
<tr>
<td>Mollusca</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Others</td>
<td>1.3</td>
<td>2.0</td>
</tr>
</tbody>
</table>

The coarse sandy sediments, however, supported greater diversity of the meiofauna compared to the fine or the algal substrata. The nematodes always formed a
dominant element of the fine coralline sediments and algae, while the annelids and copepods were more numerous in coarse coralline sediments. The numerical abundance of some meiofaunal species as elsewhere was always present, which was largely responsible for the higher total population values of the major meiofaunal groups.

The intertidal meiofaunal populations are known to have varying powers of adaptation, which largely determined their preference to colonize and thrive in a particular type of habitat. Due to this, the composition and density of the meiofaunal populations varied considerably from habitat to habitat and from locality to locality on these islands. Species which are able to withstand a fairly wide range of fluctuating conditions in the environment are widely distributed in different habitats and localities, while the others are considerably restricted in their distribution. Thus, the predominance of nematodes at different horizontal and vertical levels in these littoral sediments is due to their greater ability to withstand environmental variation and slide even in minute spaces between sediment particles. On the other hand, the other groups of animals showed a distinct preference for coarser coralline sediments with adequate interstices which facilitate their easy movement and ensure better circulation of capillary water with dissolved oxygen. Due to these reasons, the coarser and detritus coralline sands with the abundance of food favoured the colonization of a rich variety of meiofaunal species, while the fine sediments with large quantities of coralline powder supported poor populations due to inhospitable conditions of life.

As many of the lagoon beaches of Lakshadweep are supporting a rich variety of the meiofauna characteristic of clean intertidal sandy sediments, these beaches are to be regarded as relatively unpolluted. But with the increasing human activities in these islands in recent periods, these natural ecosystems on some islands have become considerably polluted and disturbed largely due to navigational activities, dredging operations, oil spills and the discharge of a great variety of waste materials into the lagoons. Large quantities of fish heads and bones are even buried in these beaches emanating foul smell. In exposed beaches, the organic contamination generally gets removed due to regular tidal action. But in the sheltered lagoon beaches, the pollutants tend to get buried in sediment for longer periods and have very limited chances for self purification by natural means. The accumulation of pollutants on these beaches have led to a degradation of natural environment and the depletion or eradication of many species of meiofauna which are quite sensitive to ecological stress. Thus, the disappearance of sensitive meiofauna species fairly indicates the degree of pollution in these beaches. The qualitative and quantitative estimations of meiofauna made on these islands for a decade showed a remarkable decline in their density and diversity. These adverse effects of pollution on the composition and density of meiofauna are clearly manifest in the lagoon beaches of some densely inhabited islands, particularly the Minicoy, Kalpeni, Kavaratti, Agatti and Kadmat. In the circumstances, effective conservation measures are necessary to arrest further degradation of natural environment on these islands.

As several areas in the Indian Ocean still remain unexplored or underexplored, our knowledge of the geographical distribution of meiofauna species in this region is to be regarded as largely incomplete. This makes it difficult to make a correct comparison of the relationships of the fauna of Lakshadweep with that of the adjacent parts. However, a zoogeographical analysis of the meiofauna of Lakshadweep shows that the composition and abundance of the genera and species are in close conformity with those known in other parts of the world. The faunal element is mostly dominated by the eurytopic species which are widely distributed in the Indian Ocean as well as those of the warm
temperate and tropical beaches. There is very little endemic element in these islands, with only a very few species discovered new to science. Hitherto, none of the genera are, however, found endemic to these islands. Out of the 152 species reported in the present study, 37 (24.3%) are cosmopolites, 51 (33.6%) eurytopics and 52 (34.2%) Indian Ocean forms, while 12 (7.9%) are endemics to the fauna of Lakshadweep (Table 2). As

<table>
<thead>
<tr>
<th>Group</th>
<th>Cosmopolitan Species</th>
<th>Eurytopic Species</th>
<th>Indian Ocean Species</th>
<th>Endemic Species</th>
<th>Total no. of Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrozoa</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Turbellaria</td>
<td>1</td>
<td>1</td>
<td>8</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Nematoda</td>
<td>11</td>
<td>18</td>
<td>8</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td>Gastrotricha</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>Kinorhyncha</td>
<td>—</td>
<td>—</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Archiannelida</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Polychaeta</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>Copepoda</td>
<td>13</td>
<td>16</td>
<td>21</td>
<td>1</td>
<td>51</td>
</tr>
<tr>
<td>Isopoda</td>
<td>—</td>
<td>1</td>
<td>2</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td>Tardigrada</td>
<td>1</td>
<td>—</td>
<td>1</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Halacarida</td>
<td>1</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>1</td>
</tr>
<tr>
<td>Mollusca</td>
<td>—</td>
<td>1</td>
<td>2</td>
<td>—</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>37</td>
<td>51</td>
<td>52</td>
<td>12</td>
<td>152</td>
</tr>
</tbody>
</table>

the character of the faunal element of an area is to be based mostly on the number of its endemic species, the meiofauna of Lakshadweep presents only a limited phylogenetic development of its own, with majority of species being those occurring on other parts of the world. Due to their geographical proximity, many species of these islands are, however, common to the adjacent parts of the Indian Ocean as Red Sea, South Africa, Madagascar, Maldives, India, Andaman Islands and Malayasia. The Lakshadweep is expected to exhibit a higher degree of endemicity due to their isolation, but recent studies on different parts of the world have clearly indicated the global distribution of many meiofauna species, limiting their endemic species a small number (Wells, 1967; Rao, 1980; Wells and Rao, 1987). Thus, the present faunal affinities and zoogeographical ranges of several meiofaunal species on the coasts of Indian Ocean are likely to change as more and more areas are investigated in this region.

**SUMMARY**

1. The paper gives a systematic account of 152 species of meiofauna belonging to the groups Hydrozoa, Turbellaria, Nematoda, Gastrotricha, Kinorhyncha, Archiannelida, Polychaeta, Copepoda, Isopoda, Tardigrada, Halacarida and Mollusca, collected from the littoral coralline sands and algae on Lakshadweep. Six species of the Gastrotricha...
are described as new to science. Most of the meiofaunal groups characteristic of intertidal sand sediments are recorded on these islands.

2. The results of the qualitative and quantitative investigations on the composition, density and distribution of the meiofauna are in close agreement with those known in other parts of the world. The zoogeographical analysis of this region shows that the faunal element is mostly dominated by eurytopic genera and species which are widely distributed along the coasts of the Indian, Pacific and Atlantic Oceans. The study thus supplements the increasing evidence that many meiofauna species are widely distributed along the warm temperate and tropical beaches of the world.

3. The coarse coralline sediments of the sheltered lagoon beaches in these islands supported the richest meiofaunal populations, while the exposed areas on storm beaches yielded their minimum numbers. The total population values recorded in these littoral sediments ranged from 340 to 2680 individuals per 10 cm². Maximum concentration of meiofauna in the intertidal sediments occurred 10–15 cm below surface near mid-water level.

4. The free-living nematodes, annelids and copepods constituted the major meiofaunal groups comprising 70 to 80% of the total. The nematodes formed a dominant element of the fine coralline sediments and littoral algae, while the annelids, copepods and other minor groups were more numerous in coarse coralline sediments.

5. The composition and density of the meiofaunal populations varied considerably from locality to locality on these islands depending on the nature of the substratum. Species which are able to withstand a fairly wide range of environmental variation are widely distributed on these islands, while the others are restricted to certain pockets.

6. Although many of the lagoon beaches on Lakshadweep are supporting a rich variety of the meiofauna, some of the densely inhabited islands indicated adverse effects of pollution on the composition and abundance of the fauna. Effective conservation measures are, therefore, necessary to arrest further degradation of natural environment on these islands.

ACKNOWLEDGEMENTS

The author is grateful to the Director, Zoological Survey of India, Calcutta, for the facilities given to carry out this work. Thanks are also due to the Administration of Lakshadweep for the facilities extended during the faunistic surveys of these islands.

REFERENCES


RAO: Meiofauna


Publisher: Zoological Survey of India, Calcutta.
While the polychaete fauna of the Indian mainland (Fauvel, 1953) and the Bay Islands (Soota et al., 1980) is fairly well known, our knowledge of this group of worms from Lakshadweep remains rather scant. Gardiner (1903) made a comprehensive survey of the fauna and geography of the Maldives and Lakshadweep during an expedition conducted in the years 1899-1900 and reported only eight species of polychaetes from Minicoy Island. Nagabhusanam and Rao (1972) studied marine fauna of Minicoy atoll and listed 21 species of polychaetes along with other group of animals. Recently, Rao and Misra (1983) recorded 26 species of polychaetes from the meiofauna of coralline sediments of these Islands. Misra and Chakraborty (1983) reported the occurrence of *Pectinaria (Pectinaria) antipoda* from Lakshadweep.

A faunistic survey of some Islands viz., Kavaratti, Agatti, Bangaram, Androth, Kiltan, Amini and Minicoy by the Zoological Survey of India was carried out during 1979-1986. The polychaete material from these islands has been examined and the results are presented here. A total of 69 species belonging to 50 genera and 23 families are recorded from different habitats of these Islands.

**LIST OF SPECIES**

**1.** *Pontogena indica* Grube, 1878
**2.** *Iphione muricate* Savigny, 1818
**3.** *Harmothoe minuta* Potts, 1910
**4.** *Lepidasthenia microlepis* Potts, 1910
**5.** *Thormora jukesi* Baird, 1865
**6.** *Eurythoe complanata* Pallas, 1767
**7.** *Notopygos hispidus* Potts, 1909
**8.** *Pherecardia striata* Kinberg, 1857
**9.** *Anaitides madeirensis* Langerhans, 1880
**10.** *Genetyllis gracilis* Kinberg, 1866
**11.** *Notophyllium splendens* (Schmarda, 1861)
**12.** *Hesione splendida* Savigny, 1818
**13.** *Leocrates diplognathus* Monro, 1826
**14.** *Pharyngeovalvata natalensis* Day, 1951
**15.** *Syllis gracilis* Grube, 1940
**16.** *Ceratonereis mirabilis* Kinberg, 1866
**17.** *Nereis (Nereis) trifasciata* Grube, 1878
**18.** *Perinereis cultrifera* Grube, 1840
**19.** *Perinereis nuntia* (Savigny, 1820)
**20.** *Perinereis vancaurica* Ehlers, 1868
21. *Glycera lancadivae* Schmarda, 1861
**22.** *Glycera tesselata* Grube, 1863
23. *Eunice antennata* (Savigny, 1820)
**24.** *Eunice (Nicidion) cincta* Kinberg, 1865
**25.** *Eunice coccinea* Grube, 1878
**26.** *Eunice marenzelleri* Gravier, 1901
27. *Eunice (Palolo) siciliensis* Grube, 1840
28. *Eunice afra afra* Peters, 1818
**29.** *Eunice afra paupera* Grube, 1878
**30.** *Eunice afra punctata* Peters, 1854
31. *Lysidice ninetta* Audouin and Milne Edwards, 1833
**32.** *Lysidice natalensis* Kinberg, 1865
**33.** *Marphysa corallina* Kinberg, 1865
**34.** *Marphysa macintoshi* Crossland, 1903
**35.** *Onuphis (Nothria) conchylega* Sars, 1835
**36.** *Oenone fulgida* (Savigny, 1818)
**37.** *Arabella mutans* (Chamberlin, 1919)
**38.** *Malacoceros indicus* (Fauvel, 1928)
**39.** *Scolelepis squamata* (Müller, 1806)
**40.** *Caulleriella capensis* (Monro, 1930)
**41.** *Cirratulus chrysoderma* Claparede, 1868
**42.** *Cirratulus cirratus* (Müller, 1776)
**43.** *Cirriformia filigera* Delle Chiaje, 1825
**44.** *Cirriformia punctata* (Grube, 1859)
**45.** *Cirriformia saxatilis* (Gravier, 1906)
**46.** *Cirriformia tentaculata* (Montagu, 1808)
**47.** *Armandia lanceolata* Willey, 1905
**48.** *Armandia leptocirris* Grube, 1878
**49.** *Dasybranchus caducus* (Grube, 1846)
**50.** *Notomastus latericeus* Sars, 1851
**51.** *Axiothella australis* Augener, 1914
**52.** *Axiothella oboekensis* (Gravier, 1906)
**53.** *Myriochele picta* Southern, 1921
**54.** *Owenia fusiformis* Delle Chiaje, 1844
**55.** *Lygdamis indicus* Kinberg, 1867
56. *Pectinaria (Pectinaria) antipoda* Schmarda, 1861
**57. Eupolytmnia nebolosa Montagu, 1818
**58. Lanice conchilega (Pallas, 1766)
*59. Loimia medusa (Savigny, 1820)
*60. Nicolea gracilibranchis (Grube, 1878)
**61. Pista robustiseta Caullery, 1915
**62. Terebella pterochaeta Schmarda, 1861
63. Terebellodibranchia agattiensis Misra and Chakraborty (in press)
**64. Thelepus comatus Grube, 1859
*65. Branchiommna nigromaculata (Baird, 1865)
*66. Hypsicomus phaeotaenia (Schmarda, 1861)
*67. Sabellasirate sanctijosephi (Gravier, 1906)
*68. Pomatostegus stellatus (Abildgaard, 1789)
*69. Spirobranchus giganteus corniculatus (Grube, 1862)

* - denotes new record from Lakshadweep.
** - denotes new record from Indian waters.

SYSTEMATIC ACCOUNT

Family APHRODITIDAE
Genus Pontogenia Claparede, 1868

1. Pontogenia indica Grube, 1878


Diagnosis : Body 23-25 mm long, covered with dorsal felt. Elytra 18 pairs. Notosetae include a bundle of very long fine capillaries forming felt, a few short capillaries and a fan of stout, erect paleae dentate on each side. Neurosetae few, stout with prominent spur below the apex.

Remarks : The specimens agree well with the original description. This is the first record of the species from Indian waters.

Distribution : India - Lakshadweep; Elsewhere - Srilanka; Singapore; Philippines.

Family POLYNOIDAE

Key to genera

1. Only two antennae, median antenna absent .................................................. Iphione
Three antennae ........................................................................................................ 2

2. Lateral antennae attached subdistally on the prostomium, 15 pairs of elytra..........
.......................................................................................................................... Harmothoe
Lateral antennae attached distally on the prostomium ....................................... 3
3. 12 pairs of elytra, notosetae all tapering.............................. *Thormora*

Several pairs of elytra, notosetae few, usually blunt.................. *Lepidasthenia*

**Genus Iphione Kinberg, 1855**

2. *Iphione muricata* (Savigny, 1818)


*Diagnosis*: Body 15-20 mm long, much flattened, fully covered by 13 pairs of elytra. Prostomium bilobed with two tentacles and four eyes. Notosetae very fine, numerous; neurosetae stout with smooth, curved apical portion.

*Distribution*: *India* - Lakshadweep; Andamans. *Elsewhere* - Zanzibar; Mozambique; South Africa; Madagascar; Maldives; Sri Lanka; Mergui; Philippines; Japan; Solomon Is.

**Genus Harmothoe Kinberg, 1855**

3. *Harmothoe minuta* (Potts, 1910)


*Diagnosis*: Body 5-6 mm long, elytra 15 pairs, globular, with very small tubercles. Notosetae broad, curved, distally serrated; neurosetae numerous, distally with fine serrations.

*Remarks*: The present material agree well with the earlier descriptions. The present record as free living form is in contrast to the earlier record of the species as commensal.

*Distribution*: *India* - Lakshadweep; Andamans. *Elsewhere* - Red Sea; Maldives.

**Genus Lepidasthenia Malmgren, 1867**

4. *Lepidasthenia microlepis* Potts, 1910


*Diagnosis*: Body 20-21 mm long with 55 segments. A band of brown pigments over 7th segment. 21 pair of elytra, very small except the first pair. Notopodium indistinct with an aciculum. Neurosetae with short, broad spinulose blades and bidentate tips.

*Remarks*: Elytra are very small and variable in numbers. The present material has 21 pairs of elytra as opposed to 19 pairs recorded by Day (1967). Otherwise, the material agree with all the earlier descriptions.

*Distribution*: *India* - Lakshadweep; Andamans. *Elsewhere* - Mozambique; Natal; Maldives; Malay Archipelago; Solomon Is.; New Caledonia.
Genus  **Thormora** Baird, 1865

5. **Thormora jukesi** Baird, 1865


*Diagnosis*: Body 20-25 mm long, with dark pigments in dorsal uncovered part. Elytra slightly reniform with smooth margin. Notosetae of two kinds, i) stout, spinulose and ii) long, smooth capillaries. Neurosetae with 8-10 rows of spines, having unidentate tips.

*Distribution*: **India** - Lakshadweep; Gujarat; Andamans. **Elsewhere** - Red Sea; Mozambique; Madagascar; Malay Archipelago; Philippines; Australia; New Caledonia; New Zealand.

**Family AMPHINOMIDAE**

**Key to genera**

1. Carancle elongated and trilobed with narrow lateral folds more or less concealed by the median ridge; neurosetae forked..........................*Eurythoe*

   Carancle broad with well developed lamellate lateral folds; neurosetae either forked or uniramous ................................................. 2

2. Two dorsal cirri per notopodium; neurosetae forked ...................... *Notopygos*

   One dorsal cirri per notopodium; neurosetae not forked, tips bent......*Pherecardia*

Genus  **Eurythoe** Savigny, 1818

6. **Eurythoe complanata** (Pallas, 1766)


*Diagnosis*: Body large, 100-200 mm long, Carancle extending up to setiger 4. Branchiae from setiger 2 onwards. Notosetae of three types, i) smooth, pointed setae, ii) harpoon setae and iii) fine setae with a small basal spur. Neurosetae of two types, i) short forked setae with unequal prongs and ii) slender setae with a small basal spur.

*Remarks*: Setal characters of the present material agree well with the earlier descriptions of the species. On irritation the worms erect their setae which break off easily, releasing poisonous contents.

*Distribution*: **India** - Lakshadweep; Andamans. **Elsewhere** - Mozambique; Natal; Madagascar; Persian Gulf; Maldives; Pakistan; Sri Lanka; Australia; Florida; West Indies.

Genus  **Notopygos** Grube, 1855

7. **Notopygos hispidus** Potts, 1909


**Diagnosis**: Body 25 mm long. The crest of the carapace separated from wings by a smooth, linear, pigmented area on each side, obscured under the basal folds of wings. Setae forked and with faint serrations in anterior few segments only.

**Distribution**: India - Lakshadweep; Andamans. Elsewhere - Red Sea; Philippines; Australia.

Genus *Phercardia* Horst, 1886

8. *Phercardia striata* (Kinberg, 1857)


**Diagnosis**: Body 50 mm long. Single dorsal cirri on each notopodium. Notosetae long, smooth, with capillaries and few harpoon setae posteriorly. Neurosetae thick with pointed tips and with finely serrated apical portion.

**Remarks**: This is the first record of the species from Indian waters.

**Distribution**: India - Lakshadweep. Elsewhere - Mozambique; Madagascar; Tahiti.

Family **PHYLLODOCIDAE**

*Key to genera*

1. Prostomium with five antennae; all tentacular segments free; parapodia biramous ................................................................. *Notophyllum*

   Prostomium with four antennae; first and second tentacular segments fused; parapodia uniramous ................................................................. 2

2. Prostomium heart-shaped, with nuchal papilla; eversible pharynx with rows of papillae at base ......................................................... *Anaitides*

   Prostomium short, wide; no nuchal papillae; eversible pharynx diffusely papillated ................................................................. *Genettellis*

Genus *Anaitides* Czerniavsky, 1882

9. *Anaitides madeirensis* Langerhans, 1880


**Diagnosis**: Body 95-100 mm long, brilliantly iridescent, greenish brown in life; proboscis covered with numerous small papillae in rows at the base. Tentacles and tentacular cirri subulate. Dorsal cirri variable in shape, usually lanceolate, ventral cirri oval, short and bluntly pointed.

**Distribution**: India - Lakshadweep; Andamans. Elsewhere - Red Sea; Mozambique; South Africa; Madagascar; Persian Gulf; Sri Lanka; Malacca Straits; China; Annam; Philippines; Bermuda; Mexico; Mediterranean Sea.
Genus Genetyllis Malmgren, 1865

10. Genetyllis gracilis (Kinberg, 1866)


Diagnosis: Body slender, 30 mm long. Prostomium heart-shaped. Tentacular cirri long and subulate. Proboscis basally covered with numerous small papillae. Dorsal and ventral cirri small and oval.

Distribution: India - Lakshadweep; Andamans. Elsewhere - Australia; Society Is.

Genus Notophyllum Oersted, 1843

11. Notophyllum splendens (Schmarda, 1861)

1861. Macrophyllum splendens Schmarda, Neue. Wirbellose Thiere. II. Leipzig, p. 82.

Material: 2 exs., Kavaratti, 4.1.1980, A. Misra


Remarks: The species is characterised by its multidigitate lobular nuchal organs.

Distribution: India - Lakshadweep; Gulf of Mannar. Elsewhere - Red Sea; South Africa; Sri Lanka; Philippines; Australia; New Caledonia;

Family HESIONIDAE

Key to genera

Two antennae, palps absent, parapodia uniramous .................. Hesione

Three antennae, palps present, parapodia biramous................... Leocrates

Genus Hesione Savigny, 1818

12. Hesione splendida Savigny, 1818


Diagnosis: Body 30-60 mm long, cylindrical and tapered posteriorly. Prostomium deeply notched posteriorly, with two minute anterolateral antennae. Pharynx smooth, with an oval dorsal tubercle in front of prostomium. Setae falcigerous with blades of varying length, tipped with two distinct teeth and a fine one.

Distribution: India - Lakshadweep; Gujarat; Andamans. Elsewhere - Red Sea; Mozambique; Madagascar.

Genus Leocrates Kinberg, 1866

13. Leocrates diplognathus Monro, 1926


Genus Genetyllis Malmgren, 1865
Diagnosis: Body 25-26 mm long. Lateral tentacles larger than the palps, postero-median tentacles short. Prostomium with a postero-median furrow, curving back to form a pair of nuchal folds. Noto setae with fine serrations and neurosetae with coarse spines. Upper jaw-platee with two pieces.

Remarks: The species is differentiated from the other related ones by its upper jaw-plate which is composed of two pieces. This is the first record of the species from Indian waters.

Distribution: India - Lakshadweep. Elsewhere - Mergui Archipelago; China Sea; Annam; Maccles field Bank.

Family SYLLIDAE

Key to genera

Pharynx without teeth; antennae, tentacular cirri and dorsal cirri indistinctly jointed......
.................................................................................................................................................................................................... Pharyngeovalvata

Pharynx with a single anterior dorsal tooth; antennae, tentacular cirri and dorsal cirri distinctly jointed.................................................................................. Syllis

Genus Pharyngeovalvata Day, 1951

14. Pharyngeovalvata natalensis Day, 1951


Diagnosis: Body 10-12 mm long. Prostomium broader than long with a pair of big eyes. Pharynx without chitinous teeth, with a fleshy valve formed by a dorsal ridge meeting with transverse ventro-lateral ridges. Setae composite with expanded shaft-heads and short fine-tipped blades.

Remarks: This is the first record of the genus from India. The earlier record is from South Africa.


Genus Syllis Savigny, 1818

15. Syllis (Syllis) gracilis Grube, 1840

1840. Syllis (Syllis) gracilis Grube, Actinien Echinodermen und Würmen des Adriatischen und Mittelmeeres, p. 77.


Diagnosis: Body short, 30-32 mm long. Pharynx long with an anterior tooth. Anterior and posterior setae with finely serrated, bidentate blades, replaced by 2-3 stout Y-shaped simple satae in middle setigers.

Distribution: India - Lakshadweep; Coasts of Maharashtra, Goa and Gujarat; Tuticorin; Gulf of Mannar; Andamans. Elsewhere - Mozambique; South Africa; Persian Gulf; Maldives; Sri Lanka; Atlantic Ocean.
Family **NEREIDIDAE**

**Key to genera**

1. Paragnaths of Gr VI either transverse bars or transverse row of small cones......
   .............................................................................................................. *Perinereis*

Paragnaths all conical, no transverse bar on Gr VI .............................................. 2

2. Chitinous paragnaths present on some or all groups of both the oral and maxillary rings ............................................................ *Nereis*

Chitinous paragnaths present on the maxillary ring only...........................................
   .............................................................................................................. *Ceratonereis*

**Genus** **Ceratonereis** Kinberg, 1866

16. Ceratonereis mirabilis Kinberg, 1866


**Diagnosis** : Body about 32 mm long. Prostomium deeply cleft. Palps elongate. Eversible pharynx with chitinous paragnaths on maxillary ring, arranged as follows: Gr I = 0; Gr II = wedge-shaped groups; Gr III = few cones; Gr IV = wedge-shaped groups. Dorsal cirri very long. Setae spinigers and falcigers. Notopodial falcigers homogomph, neuropodial falcigers heterogomph.

**Remarks** : The species is characterised by its cleft prostomium and the presence of notopodial falcigers on posterior setigers.

**Distribution** : India - Lakshadweep; Gulf of Mannar; Andamans. Elsewhere - Red Sea; Mozambique; Madagascar; Persian Gulf; Maldives; Japan; Gulf of Mexico; Brazil.

**Genus** **Nereis** Linnaeus, 1758

17. *Nereis* (Nereis) trifasciata Grube, 1878.


**Diagnosis** : Body 25-30 mm long. Eversible pharynx with paragnaths arranged as: Gr I = 0; Gr II & IV = crescentic clusters; Gr III = rectangular cluster; Gr V = 0; Gr VI = a round cluster on each side; Gr VII & VIII = a single row of 3-5 large paragnaths. Anterior setigers with two subequal notopodial lobes; in posterior setigers, superior notopodial lobes slightly expanded. Posterior notopodia with 1-2 homogomph falcigers along with homogomph spinigers.

**Distribution** : India - Lakshadweep. Elsewhere - Red Sea; Mozambique; Madagascar; Maldives; Indo-China; China Sea; Philippines; Juan Fernandez Is.

**Genus** **Perinereis** Kinberg, 1866

**Key to species**

1. A transverse row of many small conical or flattened paragnaths on group VI......
   .............................................................................................................. *P. nuntia*

One or two large flattened paragnaths on group VI .............................................. 2
2. One or two large flattened paragnaths on group VI ......................... P. vancaurica

Only one transverse paragnaths on group VI ..................................... P. cultrifera

18. Perinereis cultrifera (Grube, 1840)


Diagnosis : Body 50-150 mm long. Longest tentacular cirri reaching up to setiger 5-6. Pharyngeal paragnaths arranged as Gr.I = 1-3 cones in a line; Gr II and IV clusters of several cones; Gr III = an oval patch of several cones; Gr V = a triangular patch of three cones; Gr VI = a transverse bar on each side; Gr VII and VIII = 2-3 irregular rows of several cones. Posterior parapodia not enlarged.

Remarks : Considerable variation in the number and pattern of paragnaths and in the length of the tentacular cirri is known to occur in this species, which led to the division of the species into several subspecies. The present material, however, closely approaches the typical description of the species.

Distribution : India - Lakshadweep; Coast of Maharashtra; Travancore; Cape Comrin; Tuticorin; Gulf of Mannar; Orissa Coast; Andamans. Elsewhere - Widely recorded from Indian Ocean; Pacific Ocean; Atlantic Ocean.

19. Perinereis nunitia (Savigny, 1820)


Diagnosis : Body 100 mm long. Longest tentacular cirri reaching up to setiger 10-12. Pharyngeal paragnaths arranged as : Gr I = 1-2 cones in a line; Gr II and IV = Clusters of several cones; Gr III = rectangular patch; Gr V = 3 cones in a triangle; Gr VI = curved row of 6-10 small cone on each side; Gr VII and VIII = 2-3 irregular rows. Dorsal ligule of posterior parapodia enlarged.

Distribution : India - Lakshadweep; Okha; Coasts of Maharashtra and Goa; Tuticorin; Pamban backwaters; Chandipur; Andamans. Elsewhere - Widely recorded in Indian Ocean.

20. Perinereis vancaurica (Ehlers, 1868)

1868. Nereis vancaurica Ehlers, Die Borsten Würmen nach Systematischen und anatomischen untersuchungen dargestellt, p. 748.


Diagnosis : Body 80-100 mm long. Longest tentacular cirri extending up to setiger 4-5. Pharyngeal paragnaths arranged as : Gr I = 2 cones in a line; Gr II = several cones in two curved rows; Gr III = a square group; Gr IV = several cones forming triangular patch; Gr V = 3 cones in a triangle; Gr VI = 2 transverse bars on each side; Gr VII and VIII = 3 irregular rows. Dorsal ligule of posterior parapodia not enlarged.
Distribution: India - Lakshadweep; Coast of Maharashtra and Goa; Andamans. Elsewhere - Red Sea; Mergui; Singapore; Indochina; Philippines; Great Barrier Reef; New Zealand; Atlantic Ocean.

Family GLYCERIDAE
Genus Glycera Savigny, 1818

Key to species

A single emarginate postsetal lobe; Proboscial papillae conical with 15-20 rings........
.................................................................................................................... G. lancadiva

Two postsetal lobes; Proboscial papillae very long, not ringed.......... G. tesselata

21. Glycera lancadiva Schmarda, 1861
1861. Glycera lancadiva Schmarda, Neue Wirbellose Thiere, p. 95.


Distribution: India - Lakshadweep; Madras. Elsewhere - Madagascar; Persian Gulf; Maldives; Sri Lanka; New Caledonia.

22. Glycera tesselata Grube, 1863


Diagnosis: Pharynx eversible, with very long grooved papillae without rings. Parapodia with two subequal triangular presetal and two rounded postsetal lobes. Branchiae absent.

Distribution: India - Lakshadweep; Gujarat; Orissa; Andamans. Elsewhere - Widely recorded from Indian Ocean; Pacific Ocean and Atlantic Ocean.

Family EUNICIDAE

Key to genera

1. Five antennae, branchiae usually present ................................................................. 2

   Three antennae, branchiae absent ............................................................................. Lysidice

2. Tentacular cirri present ......................................................................................... Eunice

   Tentacular cirri absent ............................................................................................. Marphysa
Genus Eunice Cuvier, 1817

Key to species

1. Gills simple with one or two filaments starting very far from head..................... 2
   Gills branched, starting anteriorly ........................................................................ 4

2. Comb and acicular setae absent.............................................................. E. sicilienensis
   Comb and acicular setae present............................................................. 3

3. Gills begin about 28th to 30th setiger ........................................ E. marenzelleri
   Gills begin after 50th setiger................................................................. E. cincta

4. Acicular setae tridentate; gills well developed in posterior part of body .. E. antennata
   Acicular setae bidentate............................................................................. 5

5. Gills start anteriorly on 6th or 7th setiger and absent in posterior part of body......
......................................................................................................................... E. coccinea
   Gills start on 10th to 30th setiger and continue nearly to hind part of body ...... 6

6. Gills begin on 16th to 30th setiger and attain maximum development in middle part of body with 6-16 filaments................................. E. afr a afra
   Gills begin before 18th setiger and with 3-8 filaments, body with punctate spots...
......................................................................................................................... E. afr a punctata
   Gills begin after 18th setiger and with 2-4 filaments, body uniformly brown......
......................................................................................................................... E. afr a paupera

23. Eunice antennata (Savigny, 1820)
    Diagnosis : Body 115 mm long. Antennae deeply annulated. Gills commencing from setiger 6, simple on first two setigers, then pinnately branched with 6-12 filaments, reduced in mid-body region. Acicular setae yellow and tridentate.
    Distribution : India - Lakshadweep; Gulf of Mannar; Andamans. Elsewhere - Gulf of Suez; Red Sea; Southern California; North Carolina; Senegal.

24. Eunice (Nicidion) cincta (Kinberg, 1865)
    Diagnosis : Body 110 mm long. Antennae subequal; peristomial segment long with a pair of small tentacular cirri. Gills simple with 1-2 filament appear on setiger 55. Acicular setae yellow with two small blunt teeth and small guards. Comb setae present.
    Remarks : This is the first record of the species from Indian waters.
    Distribution : India - Lakshadweep. Elsewhere - South Pacific; South Africa; Senegal.
25. Eunice coccinea Grube, 1878


**Diagnosis**: Body 100-120 mm long. Antennae and tentacular cirri smooth. Anteriorly deep brown with white dots, a pale bar on setiger 4. Gills confined to anterior third of the body, appearing on setiger 5-10 and extending up to setiger 25-30, maximum with 10-12 filaments. Acicular setae black, bidentate.

**Remarks**: The species is differentiated from *E. afra* in having rounded posterior end and gill with more number of filaments. This is the first record of the species from Indian waters.


26. Eunice marenzelleri Gravier, 1901


**Material**: 1 ex., Kavaratti, 1.1.1980, A. Misra.

**Diagnosis**: Body 120 mm long. Antennae and tentacular cirri smooth. Gill filaments simple, commencing from setiger 24, extending up to posterior end. Dorsal cirri resembling gill filaments, gradually decreasing backwards. Acicular setae brown, bidentate; comb setae and composite falcigers present.

**Remarks**: *E. marenzelleri* is differentiated from the closely related species *E. siciliensis* Grube, in having acicular setae and comb setae.

**Distribution**: India - Lakshadweep; Andamans. Elsewhere - Red Sea; Persian Gulf.

27. Eunice (Palolo) siciliensis Grube, 1840


**Diagnosis**: Body 150-200 mm long. Antennae short, wrinkled; tentacular cirri smooth. Gill filaments simple, commencing from setiger 60-65, extending up to end of body. Comb setae and acicular setae absent.

**Distribution**: India - Lakshadweep; Gujarat; Gulf of Mannar; Andaman. Elsewhere - Tropical Indo-west Pacific; Atlantic; Mediterranean.

28. Eunice afra afra Peters, 1854


**Diagnosis**: Body 150-210 mm long, cylindrical. Antennae smooth, tentacular cirri shorter than peristome. Gills from setiger 25-26, continuing up to hind end of body, with 10-12 filaments in mid-body region. Acicular setae dark brown faintly bidentate.

**Remarks**: The present material agree well with those earlier recorded by Fauvel (1953) excepting the origin of gill which arises from setiger 13-20 in earlier material.
The present subspecies differs from others in the species in having gills with maximum number (10-12) of filaments.

**Distribution**: **India** - Lakshadweep; Gulf of Mannar; Andamans. **Elsewhere** - Red Sea; Gulf of Suez; Zangibar; Madagascar; Seychelles; Maldives; Sri Lanka; Mergui; Malay Seas; Philippines; Gambier Is.; New Caledonia.

29. *Eunice afra paupera* Grube, 1878


**Diagnosis**: Body 100-150 mm long, elongated, flattened posteriorly, with a dorsal median line. Gills begin from setiger 19, with 3-4 filaments, gradually decreasing posteriorly and completely absent on the last few setigers. Acicular setae black, bidentate.

**Remarks**: The present subspecies is characterised by its simple gills with only three filaments. However, Fauvel (1932) observed a range of intermediate forms between all the three subspecies in the species.

**Distribution**: **India** - Lakshadweep; Gujarat. **Elsewhere** - Red Sea; Malay Archipelago; Philippines; New Caledonia.

30. *Eunice afra punctata* Peters, 1854


**Material**: 1 ex., Kavaratti, 1.1.1980, A. Misra.

**Diagnosis**: Body 150 mm long, elongated, cylindrical, brown with small white bar over setiger 5. Gills begin on setiger 14, with filaments 4-8, gradually decreasing posteriorly and absent on few posteriormost setigers. Aciculum black, bidentate.

**Distribution**: **India** - Lakshadweep; Gujarat; Andamans. **Elsewhere** - Mozambique; South Africa.

**Genus Lysidice** Savigny, 1818

**Key to species**

Second dental plate with four teeth ......................................................*L. ninetta*

Second dental with three heavy teeth ...................................................*L. natalensis*

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


**Diagnosis**: Body 75-100 mm long, reddish with white spots and white bar on on setiger 2 and 5. Prostomial antennae short, three in number. Peristomial appendages and gills absent. Second maxillary plate with four teeth.
Remarks: Fauchald (1970) observed that the shape of the eyes on which earlier distinction was made between *Lysidice ninetta* and *L. collaris* Grube, is a variable character depending on the pigmentation related to growth. There being no other reasonable distinction, Fauchald (op. cit.) considered *L. collaris* a junior synonym of *L. ninetta*.

Distribution: India - Lakshadweep; Kilakarai; Pamban; Andamans. Elsewhere - Red Sea; tropical Indo-West Pacific; North Atlantic; North Carolina; Mediterranean Sea; angola.

32. *Lysidice natalensis* Kinberg, 1865


Diagnosis: Body 75-100 mm long, brown with minute white spots. Eyes reniform, antennae smooth, as long as prostomium. Second maxillary plate with three heavy teeth.

Distribution: India - Lakshadweep; Gujarat; Gangetic delta. Elsewhere - South Africa.

Genus *Marphysa* Quatrefages, 1865

*Key to species*

Acicular setae unidentate, compound setae spinigerous only ................. *M. macintoshi*

Acicular setae bidentate, compound setae facigerous only ................. *M. corallina*

33. *Marphysa corallina* (Kinberg, 1865)


Diagnosis: Body 55 mm long. Prostomium bilobed, gills appear on setiger 24 and with 1-4 filaments. Parapodia with dorsal capillaries and vental compound falcigers having bidentate sickle-shaped terminal piece. Acicular setae pale, bidentate, with small guards.

Distribution: India - Lakshadweep; Gulf of Mannar. Elsewhere - Red Sea; Mozambique; South Africa; Madagascar; Honolulu.

34. *Marphysa macintoshi* Crossland, 1903

Material: 1 ex., Kiltan, 2.3.1983, A. Misra.

Diagnosis: Body 75 mm long. Prostomium not distinctly bilobed, horse-shoe shaped. Gills appear on setiger 20, increasing to a maximum with 6 filaments and then gradually decreasing posteriorly. Notosetae capillaries and comb setae, neurosetae composite spinigers with knife-shaped terminal pieces. acicular setae unidentate.
Distribution: India - Lakshadweep; east coast of India. Elsewhere - Red Sea; Zanzibar; Mozambique; South Africa; Madagascar; Australia.

Family ONUPHIDAE
Genus Onuphis Audouin & Milne Edwards, 1833

35. Onuphis (Nothria) conchylega Sars, 1835

1835. Onuphis (Nothria) conchylega Sars, Bskrivalser Og Jagtlagelser overnogle moerkelige eller nye Havet ved den Bergenoke kyst levende Dyr of ployperness, ... Arter Og deres Forekommen, 12 : 61.


Diagnosis: Body 50-75 mm long. Prostomium small, globular. Gills simple appearing from setiger 9, setiger 1-3 greatly enlarged, projecting forward, each with stout setigerous lobe, very small dorsal and ventral cirri. anterior 3-4 setigers with three stout pseudo-compound hooks with bidentate tips. Succeeding setigers with few winged capillaries and pectinate setae with 10-12 fine teeth. Acicular setae stout, with bidentate tips.

Distribution: India - Lakshadweep; Gulf of Mannar; Andamans. Elsewhere - Cosmopolitan in dredgings from the Arctic to the subantarctic.

Family LYSARETIDAE
Genus Oenone Savigny, 1820

36. Oenone fulgida (Savigny, 1818)


Diagnosis: Body 110-115 mm long. Prostomium rounded with three short, stout antennae hidden under biannulate peristomial fold. Parapodia uniformly developed throughout, each with a flattened, strap-like dorsal cirrus, a short rounded presetal and a large postsetal lobe. Setae all capillaries.

Distribution: India - Lakshadweep; Nicobar Is. Elsewhere - Suez Canal; Red Sea; widely recorded from tropical Indo-west Pacific belt.

Family ARABELLIDAE
Genus Arabella Grube, 1850

37. Arabella mutans (Chamberlin, 1919)


Diagnosis: Body 110-125 mm long. Prostomium conical with four eyes. Presetal lobe rounded and postsetal lobe longer and bluntly conical. Setae winged capillaries with smooth, or finely serrated blades. Acicular setae asymmetrically hooded.

Remarks: This species is very common in fine coralline sandy sediments and characterised by its peculiar asymmetrically hooded acicular setae.
**Distribution**: India - Lakshadweep; Andamans. Elsewhere - Zanzibar; Mozambique; South Africa; Maldives; Sri Lanka; Easter Is.; North Carolina; Cape Verde Is.

Family **SPIONIDAE**

*Key to genera*

Prostomium with lateral horns, branchiae from setiger one.................. *Malacoceros*

Prostomium usually pointed; branchiae from setiger two......................... *Scolelepis*

**Genus Malacoceros** Quartrefages, 1843

38. *Malacoceros indicus* (Fauvel, 1928)


*Diagnosis*: Body 50-55 mm long. Prostomium with lateral peaks, tapering posteriorly. Branchiae cirriform, long, appearing on setiger 1 and continue up to posterior end. Dorsal lamellae lanceolate attached only at the base of branchiae, ventral lamellae rounded anteriorly and with a nipple-like projection posteriorly. Notosetae capillaries throughout the body, neurosetae capillaries in anterior setigers and hooded hooks in posterior ones.

*Remarks*: The species, occurring abundantly in silty coralline sediments, is characterised by the presence of nipple-like projection of the posterior neuropodial lamellae.

*Distribution*: India - Lakshadweep; Gulf of Mannar. Elsewhere - Mozambique; South Africa; New Caledonia.

**Genus Scolelepis** Blainville, 1828

39. *Scolelepis squamata* (Muller, 1806)


*Diagnosis*: Body 55-75 mm long. Prostomium pointed anteriorly with six eyes in a row and a well developed occipital ridge extending up to scúger 2. Notopodial lamellae fused with branchiae anteriorly, auricular and remaining free posteriorly. Bidentate neuropodial hooded hooks from setiger 30-35 onwards, notopodial hooks appearing more posteriorly.

*Remarks*: The earlier record of this species as *Nerine cirratulus* Delle Chiaje from the brackishwater channel at Visakhapatnam is based only on the anterior fragment of a small specimen.

*Distribution*: India - Lakshadweep; Visakhapatnam. Elsewhere - Mozambique; Madagascar; Pacific from west Canada to southern California; Atlantic Ocean; Mediterranean Sea.
State Fauna Series 2: Fauna of Lakshadweep

Family CIRRATULIDAE

Key to genera

1. Two large grooved palps .......................................................... Caulleriella
   Several grooved tentacular filaments .......................................................... 2

2. First branchiae appear on the same segment as the tentacular filaments .......... Cirratulus
   First branchiae appear anterior to the tentacular filaments .............. Cirriformia

Genus Caulleriella Chamberlin, 1919

40. Caulleriella capensis (Monro, 1930)

1930. Heterocirrus caputocis var. capensis Monro, Discovery Rep., 2 : 156


Diagnosis: Body short, 21 mm long. Prostomium short and conical with a pair of dark bars formed of 3-4 eyes. Branchial filaments 16 pairs restricted to the anterior part of the body, each filament arising close to notosetae. Capillaries in both rami throughout, undentate acicular hooks in both rami posteriorly.

Remarks: This is the first record of the genus from Indian waters.


Genus Cirratulus Lamarck, 1801

Key to species

Acicular hooks absent, only capillary setae present even in posterior setigers........ Cirratulus chrysoderma

Both acicular hooks and capillaries present ........................................... Cirratulus cirratus

41. Cirratulus chrysoderma Claparede, 1868


Diagnosis: Body small 20-25 mm long. Prostomium bluntly conical, without distinct eyes. Two to four pairs of tentacular filaments above the setigers 4-7. Branchial filaments stout, appear on setiger 4, extending over anterior half of the body. Acicular setae absent and only long capillaries in both rami.

Distribution: India - Lakshadweep; Gulf of Mannar; Pamban. Elsewhere - South Africa; Persian Gulf; Malay; Japan; Mediterranean Sea.

42. Cirratules cirratus (Muller, 1776)

1776. Lumbricus cirratus Muller, Zoologia Danicae Prodromus Seu Animalium Daniae et Norvegiae indigenarum characters, nomine et Synonyma imprimis popularium, Havnise, p. 215.

Diagnosis: Body 40-45 mm long. Prostomium bluntly conical with 2-4 pairs of eyes in a row. Several tentacular filaments arise about setiger 1. Branchial filaments stout, appearing on setiger 1 and extending up to the posterior end. Capillaries in both rami throughout. One or two acicular setae in the notopodia from setiger 20 onwards and 2-4 in the neuropodia, arising further anteriorly.

Remarks: This is the first record of the species from Indian waters.

Distribution: India - Lakshadweep. Elsewhere - Persian Gulf; Indo-China; Japan; Arctic Ocean; North Atlantic from the North Sea to the English Channel; Subantarctic from Magellan area and the Falkland Is. to Kerguelen.

Genus Cirriformia Hartman, 1936

Key to species

1. Branchiae of middle segments arise closer above the notosetae than distance between notosetae and neurosetae................................................................. 2
   Branchiae of middle segments arise further above the notosetae than distance between notosetae and neurosetae................................................................. 3
   2. Tentacular filaments arise above setiger 5-6; branchiae slender and thread like....... ............................................................ C. tentaculata
      Tentacular filaments arise above setiger 2-4; branchiae fairly stout ...... C. saxatilis
      3. Body speckled with black pigments; gills and tentacles barred.......... C. punctata
         Body uniformly brown; gills and tentacles uniformly yellow or orange .. C. filigera

43. Cirriformia filigera (Delle Chiaje, 1825)
   Diagnosis: Body long, slender, 125-150 mm long. Prostomium bluntly conical, without distinct eye spots. Numerous tentacular filaments appear on setigers 4-6. Branchiae appear on setiger 1, extending nearly to posterior end, capillaries in both rami throughout. Hooks in both rami from setiger 12 onwards.

44. Cirriformia punctata (Grube, 1859)
   Diagnosis: Body 35 mm long, brown with scattered black pigments. Prostomium rounded without eyes. Tentacular filaments and branchiae barred. Tentacular filaments numerous appearing on setiger 4. Branchiae from setiger 1 to posterior end. Capillary setae in both rami throughout, slender hooks from setiger 12 onwards.
Distribution: India - Lakshadweep; Gujarat; Andamans. Elsewhere - Widely recorded in circumtropical region.

45. Cirriformia saxatilis (Gravier, 1906)


*Diagnosis*: Body 45-50 mm long, Prostomium rounded. Tentacular filaments arise above setigers 2-3. Branchiae from setiger 1 to the posterior half of the body. Capillaries in both rami throughout; neuropodial hooks appear on setiger 8, notopodial hooks appear posteriorly (from about setiger 35-40).

*Remarks*: This is the first record of the species from Indian waters.


46. Cirriformia tentaculata (Montagu, 1808)


*Diagnosis*: Body 85 mm long; uniformly brown with reddish branchiae. Prostomium pointed. Tentacular filaments numerous arising in two clusters above setiger 5-7. Branchial filaments from setiger 1 onwards. Capillary setae in both rami throughout; hooks unidentate, appearing after setiger 45.

*Distribution*: India - Lakshadweep; Gujarat; Andamans. Elsewhere - Mozambique; South Africa; Persian Gulf; Japan; New Caledonia; New Zealand; Campbell Is; Eastern Atlantic from the North Sea to the English Channel; South of Morocco; tropical western Africa.

Family OPHELIDAE

Genus Armandia Filippi, 1861

*Key to species*

29-30 setigerous segments..........................................................A. lanceolata

33-37 setigerous segments..........................................................A. leptocirrus

47. Armandia lanceolata Willey, 1905


*Distribution*: India - Lakshadweep; Pamban; Andamans. Elsewhere - Persian Gulf; Indo-China; Australia; New Caledonia.

48. Armandia leptocirrus Grube, 1878

Diagnosis: Body 18 mm long, Branchiae from setiger 2 to the last setiger. Lateral eye-spots on setigers 7-15. Setae of last few setigers longer than those of preceding setigers. Anal funnel long, obliquely truncate, with a long ventral cirrus having 12 fine papillae.

Distribution: India - Lakshadweep; Gulf of Mannar; Andamans. Elsewhere - Red Sea; Mozambique; South Africa; Persian Gulf; Philippines; Indo-China; New Caledonia.

Family CAPITELLIDAE

Key to genera

Thorax with 14 segments; branchiae simple or composite..............Dasybranchus
Thorax with 12 segments; branchiae may be present......................Notomastus

Genus Dasybranchus Grube, 1850

49. Dasybranchus caducus (Grube, 1846)

1846. Dasybranchus caducus Grube, Sabellaria, 14 : 166.


Distribution: India - Lakshadweep; Gulf of Mannar; Andamans. Elsewhere - Red Sea; Mozambique; South Africa; Madagascar; Maldives; Mediterranean Sea.

Genus Notomastus Sars, 1851

50. Notomastus latericeus Sars, 1851


Diagnosis: Body 150-175 mm long. Thoracic setigers 11; one another asetigerous segment. Thorax with capillary setae only. Abdominal neuropodia with long rows of hooks, almost meeting in mid-vental line. Branchiae rudimentary, represented by small swellings of abdominal notopodia and slightly larger triangular projections of the superior edge of neuropodia. A lateral organ between notopodia and neuropodia.

Distribution: India - Lakshadweep; Gujarat; Andamans. Elsewhere - Widely recorded from the Arctic to the Antarctic.

Family MALDANIDAE

Genus Axiothella Verrill, 1900

Key to species

Slender bipinnate setae present.......................................................A. australis
Slender bipinnate setae absent....................................................A. obockensis
51. Axiothella australis Augener, 1914


Diagnosis : Body 15-35 mm long, with oval, slanting cephalic plate; cephalic rim notched; nuchal groove straight. Anal funnel with alternating cirri, without slender ventral cirrus. Long slender bipinnate setae present.

Distribution : India - Lakshadweep; Gulf of Mannar; Andamans. Elsewhere - South Australia.

52. Axiothella obockensis (Gravier, 1906)


Family OWENIIDAE

Key to genera

Head rounded, without feeding membrane or palps.................................Myriochele
Head provided with a frilly feeding membrane..............................................Owenia

Genus Myriochele Malmgren,

53. Myriochele picta Southern, 1921


Diagnosis : Body small, 5-10 mm long. Tubes cylindrical covered with small sand grains. Prostomium and peristomium fused, first three thoracic segments with capillary setae only. First two abdominal segments longer; abdomen with notopodial capillaries and neuropodial bidentate hooks.

Remarks : The present record of M. picta, a brackish water form, from the marine habitat of Lakshadweep is interesting.

Distribution : India - Lakshadweep; Chilka Lake.

Genus Owenia Delle Chiaje, 1844

54. Owenia fusiformis Delle Chiaje, 1844

1844. Owenia fusiformis Delle Chiaje, Descrizione e notomia degli animali invertebrati della Sicilia catiore osservati vivinegli anivi., p.31.


**Distribution**: India - Lakshadweep; Tuticorin; Orissa coast. Elsewhere - Cosmopolitan.

Family **SABELLARIIDAE**
Genus **Lygdamis** Kinberg, 1867

55. **Lygdamis indicus** Kinberg, 1867


**Material**: 2 exs., Minicoy; 14.3.1983, A. Misra.

**Diagnosis**: Body 30-35 mm long. Operculum oval and slanting. External paleae smooth, straight, tapering; inner paleae stouter with a blunt tip. A medical cirrus, a pair of large grooved palps and 8-9 rows of slender buccal cirri on the inner side of the opercular peduncles.

**Distribution**: India - Lakshadweep; Andamans. Elsewhere - Tropical Indo-west Pacific.

Family **PECTINARIIDAE**
Genus **Pectinaria** Lamarck

56. **Pectinaria (Pectinaria) antipoda** Schmarda, 1861

1861. *Pectinaria antipoda* Schmarda, New Wirbellose Thiere beobachtet und gesammelt auf einer Reise Um die Erde., p. 46.

**Material**: 1 ex., Kavaratti, 1.1.1980, A. Misra.

**Diagnosis**: Body large, stout; 58 mm long; with an anterior operculum and three body regions. Cephalic region with 4 segments, thorax with three and abdomen with 14 segments. Opercular margin smooth, ventrally with a fan of stout golden paleae and ventrolaterally with the first pair of tentacular cirri; a cephalic veil and numerous buccal tentacles. Second cephalic segment with second pair of tentacular cirri, third and fourth with lamellated gills. Three thoracic segments with capillary notosetae only. Thirteen abdominal segments uncinigerous, last one with only notosetae.

**Distribution**: India - Lakshadweep; Andamans. Elsewhere - Persian Gulf; New South Wales; New Caledonia.

Family **TEREBELLIDAE**

**Key to genera**

1. Branchiae present as simple filaments................................. **Thelepus**  
   Branchiae present as branched filaments................................. 2

2. Noto setae with smooth tips.................................................. 3
   Noto setae with denticulate tips............................................ 7
3. No lateral lobes, two pairs of gills.................................Nicolea
   Lateral lobes present, three pairs of gills ...........................4
4. Uncini of first segment with a long shaft ..........................Pista
   Uncini of the first segment short and similar to those of latter segments ..... 5
5. Uncini pectiniform with a single vertical series of teeth ..............Loimia
   Uncini normal and avicular with close-set arcs of denticles above the main fang... 6
6. Uncini set back to back on posterior thorax ..........................Lanice
   Uncini not set back to back ........................................Eupolymnia
7. Two to three pairs of arborescent gills on segments 2 to 4............Terebella
   Two pairs of stalked gills at intervals on segments 3 to 7...Terebellodibranchia

Genus Eupolymnia Verrill, 1900

57. Eupolymnia nebulosa (Montagu, 1818)
   Diagnosis : Body 35-40 mm long, with 17 thoracic setigers. Tentacular lobe with several small eye-spots, small lateral lobes on segments 2 and 3. Notosetae winged, with smooth tips, on segments 4 to 17. Uncini from Segment 5, each with two large teeth and 2-3 denticles above the main fang. Abdominal uncini on short pinnules.
   Remarks : The species was reported earlier from India as Polymnia nebulosa (Montagu)
   Distribution : India - Lakshadweep; Gulf of Mannar; Pamban Is.; Andamans.
   Elsewhere - South Africa; Madagascar; Persian Gulf; Maldives; Japan; Atlantic from Scotland and English Channel to tropical western Africa and the Falkland Is.; Mediterranean Sea.

Genus Lanice Malmgren, 1866

58. Lanice conchilega (Pallas, 1766)
   Material : 1 ex., Kavaratti, 29.3.1984, A. Misra.
   Diagnosis : Body 120 mm long with 17 thoracic setigers. Tentacular lobe with several eye-spots. Large lateral lobes on segment 3, covering segment 2. Three pairs of subequal gills on segment 2-4. Uncini avicular, set back to back on posterior thorax, with two large teeth and several small teeth above the main fang. Abdominal uncini on long pinnules.
   Remarks : This is the first record of the species from Indian waters.
   Distribution : India - Lakshadweep. Elsewhere - Mozambique; South Africa; Persian Gulf; Southern California; Atlantic from Sweden to English and tropical west Africa; Mediterranean Sea.
Genus **Loimia** Malmgren, 1866

59. **Loimia medusa** (Savigny, 1820)


**Material**: 3 exs., Kavaratti, 3.1.1980, A. Misra.

**Diagnosis**: Body 150-175 mm long, with 17 thoracic setigers. Tentacular lobe short with several eye-spots. Lateral lobe membranous, horizontally placed over segments 2 and 3. Uncini pectiniform with a single vertical series of 5-6 teeth, in double rows, set back to back on posterior thorax. Abdominal uncini on square pinnules.

**Distribution**: India - Lakshadweep; Gujarat; Gulf of Mannar; Andamans. *Elsewhere* - Red Sea; Mozambique; South Africa; Madagascar; Persian Gulf; Sri Lanka; Burma; Indo-China; Japan; south California; North Carolina, West Indies; English Channel.

Genus **Nicolea** Malmgren, 1866

60. **Nicolea gracilibranchis** (Grube, 1878)


**Diagnosis**: Body 65-75 mm long, with 17 thoracic setigers. Lateral lobes absent, Eye-spots hidden under cephalic folds. Gills 2 pairs on segments 2 and 3. Uncini avicular, with two teeth above the main fang, on projecting abdominal pinnules.

**Distribution**: India - Lakshadweep; Gujarat; Tuticorin; Pamban; Gulf of Mannar; Madras Coast; Andamans. *Elsewhere* - Japan; Philippines; Hawaii.

Genus **Pista**, Malmgren, 1866

61. **Pista robustiseta** Caullery, 1915


**Diagnosis**: Body 25-26 mm long, with 17 thoracic setigers. Tentacular lobe short. Lateral lobes on first three segments. Uncini from setiger 2 with a stout, broad and long shaft in first segment, becoming more slender afterwards.

**Remarks**: This is the first record of the species from Indian waters.

**Distribution**: India - Lakshadweep. *Elsewhere* - Gulf of Oman; Malay Sea; Japan.

Genus **Terebella** Linnaeus, 1767

62. **Terebella pterochaeta** Schmarda, 1861


**Material**: 3 exs., Kavaratti, 1.1.1980, A. Misra.

**Diagnosis**: Body 75-90 mm long, with 29 thoracic setigers. Tentacular lobe short with several eye-spots. No lateral lobes. Gills two pairs on segments 2-3. Notosetae
with winged shaft and denticulate tips. Uncini avicular, with 3-4 irregular arcs of teeth above the main fang.

Remarks: This is the first record of the species from Indian waters.

Distribution: India - Lakshadweep. Elsewhere - Red Sea; South Africa; Indo-China; New Caledonia; Senegal.

63. Terebellodibranchia agattiensis Misra and Chakraborty


Diagnosis: Tentacular lobe very short and Collar-shaped with numerous long tentacles and few eye-spots. Two pairs of branched gills on segments 3 and 7. No lateral lobes on the first few segments. Noto setae start on segment 4 and continuing for a variable number of segments, with serrated blades. Uncini avicular, start on segment 5 and set in double rows, face to face from segment 10.

Remarks: The genus _Terebellodibranchia_ is easily distinguished from all the related genera in having only two pairs of gills well separated on thoracic segments 3 and 7.

Distribution: India - Lakshadweep.

Genus _Thelepus_ Leuckart, 1849

64. _Thelepus comatus_ (Grube, 1859)


Diagnosis: Body 55 mm long, Tentacular lobe without eye-spots. Branchiferosous segments 3, with numerous gill filaments. Noto setae smooth-tipped capillaries, from segment 3 onwards. Uncini avicular, with the base prolonged forward (prow); prow and button well developed, first set in single row, double rows in middle and posterior thoracic segments.

Remarks: This is the first record of the species from Indian waters.

Distribution: India - Lakshadweep. Elsewhere - South Africa; South Arabia; Chile; Tristan da Cunha.

Family SABELLIDAE

Key to genera

1. Thoracic neurosetae include a row of avicular uncini and a row of pick-axe setae ....

Hypsicomus

Thoracic neurosetae with a single row of avicular uncini only ................. 2

2. Branchial radioles with external lappets or stylodes......................... Branchiomma

Branchial radioles without external stylodes ................................... Sabellastrate
Genus  * Branchiomma* Kolliker, 1858

65. *Branchiomma nigromaculata* (Baird, 1865)


**Diagnosis**: Body 60-65 mm long. Irregularly spotted with dark pigments. Branchial lobe semi-circular, radioles arranged in a single whorl. A row of long stylodes at the base of the radioles. Thoracic uncini avicular, with two arcs of teeth above the main fang, first with 4-5 and second with 6-7 minute teeth.

**Distribution**: India - Lakshadweep; Andamans. Elsewhere - Red Sea; Mozambique; South Africa; Madagascar; Gambier, Japan; Atlantic from North Carolina, gulf of Mexico and west Indies to Cape Verde Is.

Genus  * Hypsicomus* Grube, 1870

66. *Hypsicomus phaeotaenia* (Schmarda, 1861)


**Diagnosis**: Body 45-50 mm long, branchial lobes borne on a common stalk. Collar very low, with a smooth, straight margin. Collar setae with very short and broad blades set in double rows. Thoracic notosetae with winged capillaries and paleae with rounded blades, without definite tips. Thoracic neurosetae include both pick-axe setae and avicular uncini. Abdominal notosetae avicular uncini and neurosetae of winged capillaries and paleae.

**Distribution**: India - Lakshadweep; Gujarat; Gulf of Mannar; Andamans. Elsewhere - Red Sea; tropical Indo-west Pacific from the Persian Gulf and Madagascar to west Australia, New Caledonia and Japan; Western Africa; Mediterranean Sea.

Genus  * Sabellastrate* Savigny, 1818

67. *Sabellastrate sanctijocephi* (Gravier, 1906)


**Material**: 1 ex., Kavaratti, 4.1.1980, A. Misra.

**Diagnosis**: Body 75 mm long, irregularly spotted with dark brown pigments. Individual radioles without external stylodes and eye-spots. Collar widely separated dorsally. Thoracic notosetae winged capillaries. Thoracic neurosetae with a single row of avicular uncini, each with the main fang surmounted by a prominent straited crest.

**Distribution**: India - Lakshadweep; Gujarat; Andamans. Elsewhere - Red Sea; tropical Indo-west Pacific from South Africa to Japan and New Caledonia; western Africa.
Family SERPULIDAE

Key to genera

Operculum a calcareous plate with branching processes .........................Spirobranchus

Operculum one or a vertical series of chitinous plates, without branching processes......
.......................................................................................................................... Pomatostegus

Genus Pomatostegus Schmarda, 1861

68. Pomatostegus stellatus (Abildgaard, 1789)


Diagnosis : Body 35-50 mm long, operculum with several horny denticulated discs set one above the other, on a hollow pillar with 2-3 rows of spines at the top. Peduncle flat, with broad smooth wing. Collar developed. Abdominal setae sickle-shaped.

Distribution : India - Lakshadweep; west coast of India; Gulf of Mannar; Andamans. Elsewhere - Cosmopolitan in Indo-Pacific and Atlantic Oceans.

Genus Spirobranchus Blainville, 1818

69. Spirobranchus giganteus corniculatus (Grube, 1862)


Diagnosis : Body 45-50 mm long, with 4-6 whorls of branchial radioles, bright red. Opercular peduncle broad with elongated oval wing. Operculum simple, with 2-3 spines originating from a common base. Collar with two smaller lateral lobes and one larger ventral lobe. Collar setae with a hispid boss at the base of the blade, spinulose distally. Thoracic notosetae limbate capillaries and neurosetae uncinus with 16-20 teeth in a single row.

Distribution : India - Lakshadweep; Nicobar Is. Elsewhere - Red Sea; Mozambique; South Africa; Great Coco Is.; Malay Archipelago; Japan; Philippines; Eastern Australia; New Caledonia.

SUMMARY

The paper deals with a taxonomic account of 69 species of polychaetes spread over 50 genera and 23 families, collected from the coralline sediments of Lakshadweep, Indian Ocean. Fifty nine species have been recorded for the first time from Lakshadweep, of which two genera viz., Pharyngeovalvata and Caulleriella, and 13 species are also new to Indian waters.
ACKNOWLEDGEMENTS

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REFERENCES


SIPUNCULA

BADRI PRASAD HALDAR
Zoological Survey of India, Calcutta - 700 016

INTRODUCTION

The present article gives a taxonomic account and a list of the little-known sipunculan species from the Lakshadweep, India. The study is based on the material collected during 1979-1980 and 1984 by the author from Kavaratti, Agatti, Bangaram, Androth, Kadmat, Amini and Kalpeni in the north and Minicoy in the south of the Archipelago. Besides, some species were also studied from the collection made at Kavaratti and Minicoy in 1986 by Dr. D. R. K. Sastry of this Institute. Earlier, Shipley (1903) reported 14 species of sipunculans from Minicoy of which only 10 are considered valid in the present study. In all, 17 species in 9 genera distributed over 4 families with a key to genera and species are reported here. Of these, 5 species constitute new locality records for the Lakshadweep including 3 species new to the Indian coast. In addition, a new subspecies of Lithacrosisphon cristatus is also being described. Two species, Physcosoma ruppelli Grube and Phascolosoma dissors Sel. and de Man reported by Shipley (1903) from Minicoy, Lakshadweep have been deleted because of uncertain status or identity (Cutler, 1979; Cutler and Cutler, 1983). Xenisphon (Xenopsis) indicus described by Johnson (1969) from Minicoy was found to be conspecific with Sipunculus indicus Peters (Cutler and Cutler, 1985). Further, Golfingia pyriformis reported by the author in 1975 has been found to be Themiste lageniformis on re-examination. Thus, all the species so far recorded earlier are from extreme south of this archipelago. With this, survey of material in the major components of the northern Lakshadweep, as conducted by the author and Dr. Sastry, is of certain relevance as to their distributional point of view. Some aspects on the habits, habitats and biogeography of the fauna are also discussed.

LIST OF SIPUNCULA FROM THE LAKSHADWEEP

SPECIES HITHERTO RECORDED

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<td>Physcosoma agassizii</td>
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REVISED LIST OF SPECIES

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<td>Sipunculus indicus</td>
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<td>Siphonosoma cumanense</td>
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<tr>
<td>Themiste lageniformis</td>
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<tr>
<td>Phascolosoma agassizii</td>
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<tr>
<td>P. albolineatum</td>
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</tbody>
</table>
Key to genera and species of SIPUNCULA from the Lakshadweep

1. Tentacles enclosing the central mouth on oral disc...............................2
   Tentacles enclosing the nuchal organ on oral disc but not the mouth........4

2. Longitudinal muscle layer gathered into bands ..................................3
   Longitudinal muscle layer continuous........................................Themiste Gray
   Tentacles borne on 4 stem-like extensions; contractile vessel with short and finger-like villi; fixing muscles 3 in number ........................................lagentiformis Baird

3. Spindle muscle not attached posteriorly .......................................Sipunculus Linnaeus
   Spindle muscle arising from rectum; without protractor muscle ..........indicus Peters
   Spindle muscle attached posteriorly .......................................Siphonosoma Spengel
   Introvert with hooks; rectum with caecum and with numerous accessory caeca......
   ........................................................................vastum (Selenka & Bulow)
   Introvert without hooks; rectum with caecum and without accessory caecum ......
   ..........................................................................................cumanense (Keferstein)

4. Anterior end of trunk modified to form horny epidermal or calcareous anal shield...5
   Anterior end of trunk not modified to form anal shield..........................7

5. Introvert arising from centre of anal shield .................................Cloeosiphon Grube

S = Shipley (1903), J = Johnson (1969), H = Haldar (1975)
Shield with a large number of calcareous units..........................aspergillus (Quatrefages)  
Introvert arising from ventral side of anal shield........................................6

6. Shield with a large number of horny units .........................Aspidosiphon Diesing
Longitudinal muscle layer gathered into bands; bidentate introvert hooks with posteriorly directed tongue-like extension of clear streak...........steenstrupii Diesing
Shield with a single solid calcareous unit............................Lithacrosiphon Shipley
Anal shield with converging furrows...........cristatus lakshadwepeensis subsp. nov.

7. Contractile vessel with villi; without introvert hooks .............................................................Antillesoma Stephen & Edmonds
Oral disc carrying 42-50 tentacles..............................antillarum (Grube & Oersted)
Contractile vessel without villi; with introvert hooks ........................................8

8. Longitudinal muscle layer continuous...............................Apionsoma Sluiter
Retractor muscles two pairs; introvert hooks with accessory comb of spinelets at base ...........................................Apionsoma sp. [cf. misakiana (Ikeda)]
Longitudinal muscle layer gathered into bands ..................Phascolosoma Leuckart

a. Nephridia more than half as long as a trunk..............................b
Nephridia never more than half as long as trunk..............................c
b. Hook with a clear crescentic area; nephridiopores more or less at same level as anus........................................stephensoni (Stephen)
Hook without clear crescentic area; nephridiopores in front of anus......................


c. Apex of hook at right angle to main axis..........................albolineatum Baird
Apex of hook at an obtuse angle..............................................d
d. Triangular area of the hook present..............................................e
Triangular area of the hook absent..............................................g

e. Accessory tooth present on concave edge of hook.........................f
Accessory tooth absent on concave edge of hook.............agassizii Keferstein
f. Papillae on postero-dorsal surface of introvert always spiniform and posteriorly directed ........................................perlucens Baird
Papillae on postero-dorsal surface of introvert not spiniform and not posteriory directed ........................................scolops (Selenka & de Man)
g. Central clear streak of hook having expansion basally and at its middle.....................nigrescens Keferstein
Central clear streak of hook having no such expansion......japonicum Grube
SYSTEMATIC ACCOUNT

Class SIPUNCULIDEA
Order SIPUNCULIFORMES
Family SIPUNCULIDAE
Genus Sipunculus Linnaeus

1. Sipunculus indicus Peters


Description : Trunk 260-450 mm long and 13.5-27 mm wide. Introvert mostly retracted inside, 10-26 mm long. Tentacular membrane divided into six lappets enclosing the central mouth. Longitudinal muscle layer separated into 35-44 rarely anastomosing bands. Circular muscle layer also divided into separate bands. Retractor muscles two pairs, arising almost at same level from anterior one-sixth to one-tenth of trunk length. Rectum with a tuberous caecum. Spindle muscle arising from ventral wall of rectum and free posteriorly. Contractile vessel paired and without villi. Nephridia more or less completely attached and opening posterior to anus.

Remarks : The specimens examined agree well with S.indicus. Xenosiphon (Xenopsis) indicus Johnson, 1969 was relegated to the synonymy of S. indicus Peters by Cutler and Cutler (1985).

Distribution : This is an Indo-West Pacific shallow water species known from the east coast of Africa to Indonesia and Western Australia, extending further to South China Sea in the north and Coral Sea in the south. Twice it was reported from Minicoy. The present record extends its range northwards in the Lakshadweep.

Genus Siphonosoma Spengel

2. Siphonosoma, cumanense (Keferstein)

1867. Phascolosoma cumanense Keferstein, Z. wiss. Zool., 17 pl.6, figs. 19-21


Description : Trunk 85-121 mm long and 9.5-12 mm wide. Introvert 22-26 mm long when fully everted and without hooks. Tentacles 22-30 in number encircling the mouth. Longitudinal muscle layer divided into 19-21 slightly anastomosing bands. Retractor muscles two pairs, originating more or less at same level from anterior one-fourth of trunk. Rectum with caecum and without any accessory caecum. Spindle muscle arising anteriorly by three roots and anchoring intestinal coil posteriorily. Contractile vessel with numerous short villi. Nephridia opening just anterior to anus. Transverse crescent-shaped dissepiments, coelomic papillae and oval bodies present.
Remarks: Shipley (1903) reported two species of Siphonosoma, viz., S. billitonensis and S. cumanensis from Minicoy. But recent studies on their taxonomic status (vide, Stephen and Edmonds, 1972; Cutler, Cutler and Nishikawa, 1983) showed that S. edule (= S. billitonensis) is synonymous with S. cumanense. The name cumanense though junior to edule is currently accepted because of its very familiar and wide usage.

Distribution: This is a common species found in the intertidal and shallow water of the tropical Indian and West Pacific Ocean, and rare in the West Atlantic. This was previously reported from Minicoy and presently from further north in the Lakshadweep.

3. Siphonosoma vastum (Selenka and Bulow)

1883. Sipunculus vastus Selenka and Bulow, Reisen im Archipel der Philippinen, (2) 4 (1) : 103-104, figs. 171, 179.

Material examined: None.

Remarks: Several specimens of Sipunculus vastus var. albus were reported by Shipley (1903) from Minicoy but he added not taxonomic notes. However, it is a well known species and the key characters are based on the material from the Andamans available with the author (1975).

Distribution: This shallow water Indo-West Pacific species has been reported from the east coast of Africa to Indonesia, Japan, Australia and several Pacific Islands.

<table>
<thead>
<tr>
<th>Order</th>
<th>GOLFINGIIFORMES</th>
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<tr>
<td>Family</td>
<td>THEMISTIDAE</td>
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<tr>
<td>Genus</td>
<td>Themiste Gray</td>
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</tbody>
</table>

4. Themiste lageniformis Baird


Description: Trunk 15-25 mm long, tending to curve ventrally. Introvert without hooks, about one-third to one-fifth of trunk length and with blue pigmented band near its middle. Tentacles basically enclosing the mouth and arising from 4 primary stems. Muscle layers of body wall continuous. Retractor muscles single pair. Spindle muscle free posteriorly. Fixing muscles three in number. Contractile vessel with short and finger-like villi. Nephridia completely free and opening at the same level as anus.

Distribution: This is widely distributed in tropical and subtropical Atlanto-Indo-West Pacific region. Previously it was reported from Minicoy only.
Class PHASCOLOSOMATIDEA
Order PHASCOLOSOMATIFORMES
Family PHASCOLOSOMATIDAE
Genus Phascolosoma Leuckart

5. Phascolosoma agassizii Keferstein


Material examined : 1 ex., Kavaratti, 4.ii.1986.

Description : Trunk 30 mm long, opaque-skinned and with bluntly rounded posterior end. Introvert retracted and about half the length of trunk. Hooks arranged in 10 rows, with indistinct triangular area and without accessory tooth; apex of hook bending at an obtuse angle. Longitudinal muscle layer separated into 19-21 anastomosing bands. Retractor muscles two pairs. Rectum with caecum. Spindle muscle attached posteriorly. Nephridia about half as long as the trunk and attached by their anterior half.

Remarks : The species was earlier extracted from the coral rocks of Minicoy where it was found together with Siphonosoma vastum in sand by Gardiner (in Shipley, 1903).

Distribution : This intertidal species is cosmopolitan occurring in the tropical and temperate waters excepting South America.

6. Phascolosoma alboelineatum Baird


Description : Trunk 20-50 mm long, thin-skinned and tapering posteriorly. Introvert about three-fourths of the trunk in length; with irregular brown bands and rings of hooks; apex of hooks at right angle to main axis. Tentacles 14-18 in number, arranged nearly in a ring dorsal to mouth enclosing the nuchal organ. Longitudinal muscle layer grouped into 20-23 bands. Retractor muscles two pairs. Spindle muscle attached posteriorly. Nephridia about half as long as the trunk and opening almost at the anal level.

Remarks : It is rather interesting to note that the longitudinal muscle bands are prominently anastomosed in some specimens irrespective of the above localities, while rectal caecum is present in about 10% of the specimens examined from Bangaram.

Distribution : This intertidal and shallow water tropical species is widely distributed in the Indo-West Pacific region. It is newly recorded here for the first time from the Lakshadweep.
7. Phascolosoma japonicum Grube


**Material examined**: 2 exs., Minicoy, 14.xii.1979.

**Description**: Trunk 25 and 32 mm long, opaque-skinned and light brown in colour. Introvert about three-fourths as long as trunk and without any dark patch on its dorsal surface. Tentacles about 18 in number, arranged in a semi-circle. Hooks arranged in 30 rings distally and scattered proximally; each with a small accessory tooth, apex obtuse and broader than high. Large cone shaped papillae at the base of introvert and posterior end of trunk, of which only the latter posteriorly directed. Longitudinal muscle layer with 24-30 anastomosing bands. Retractor muscles two pairs. Spindle muscle attached posteriorly. Fixing muscle single. Nephridia nearly half as long as trunk and partly attached.

**Remarks**: Fixing muscle is variable in structure, which is single in one specimen and bifurcated in the other. In the latter case, one end is attached to post-oesophageal gut and the other to first intestinal coil.

**Distribution**: This is an intertidal and shallow water species occurring mainly in the Indo-Pacific area. It was also reported from west coast of South Africa by Wesenberg-Lund (1963). It constitutes new locality record for the Lakshadweep.

8. Phascolosoma nigrescens Keferstein


**Description**: Trunk 10-28 mm long, thick-skinned with rather tapering posterior end. Introvert three-fourths to one and a quarter as long as the trunk; with about 20 tentacles at its tip and 30-45 complete rows of obtuse-angled hooks at its distal end, each hook with a clear transparent streak slightly expanded in middle and base but without triangular area. Longitudinal muscles grouped into 23-27 bands. Retractor muscles two pairs. Rectum short and without caecum. Spindle muscle attached posteriorly. Fixing muscle single and bifurcated. Nephridia half as long as trunk and partly attached.

**Remarks**: In most of the specimens pigmented transverse bands are present on the dorsal surface of introvert. Rectal caecum is absent in the present material, though its presence was reported in the literature (Wesenberg-Lund, 1963; Edmonds, 1980)

**Distribution**: This is a common circumtropical and subtropical shallow water species. It constitutes new locality record for the Lakshadweep.

9. Phascolosoma pacificum Keferstein


**Description**: Trunk 38-50 mm long. Introvert 1.2 to 1.7 times as long as the trunk, with 27-30 tentacles and hooks in 75-100 complete rows followed by some incomplete rows or scattered hooks. Each hook with strongly curved apical tooth and blunt accessory tooth together with triangular area besides the central streak. Longitudinal muscles in 23-35 bands often anastomosed. Retractor muscles two pairs. Rectum short and without caecum. Spindle muscle attached posteriorly. Fixing muscle single. Nephridia almost fully attached and usually brown, reaching nearly the posterior end of trunk.

**Remarks**: Specimens generally possess irregularly pigmented bands on the dorsal surface of the introvert. Two specimens from Minicoy possess about 210 complete and incomplete rows of hooks; at least one specimen from Agatti lacks the triangular area in some of the hooks.

**Distribution**: This is a widespread shallow water member in the Indo-West Pacific. This was previously reported from Minicoy and presently from further north in the Lakshadweep.

10. *Phascolosoma perlucens* Baird


**Description**: Trunk 47-61 mm long, thin-skinned and gradually tapering at posterior end. Introvert half to three-fourths the length of trunk, with short digitiform tentacles and 18-21 rows of hooks. Each hook sharply bent at apex forming at obtuse angle with the main axis and provided with accessory tooth, dark bordered central streak and clear triangular area. Papillae large, dark brown, conical, sharply spiniform and posteriorly directed on the postero-dorsal surface of introvert. Longitudinal muscle bands 19-22 and externally visible. Retractor muscles two pairs, ventral pair stouter than the dorsal. Rectum long and without caecum. Spindle muscle attached posteriorly. Fixing muscle single. Nephridia shorter than half the length of trunk and free at their posterior third.

**Remarks**: Majority of the specimens examined have clear streak of hook expanded near middle. A few specimens show strong anastomosis of longitudinal muscle bands.

**Distribution**: This is a tropical shallow water species mainly found in the Pacific, occasionally found in the Indian Ocean and the Caribbean Sea of the Atlantic. This was previously reported from Minicoy and presently from further north in the Lakshadweep.
11. Phascolosoma scolops (Selenka and de Man)

1883. Phymosoma scolops Selenka and de Man, Reisen im Archipel der Philippinen, (2) 4 (1) : 75-76, figs. 138-144.


Description : Trunk 15-18 mm long, thin-skinned with scattered reddish brown patches. Introvert longer than trunk, with brown irregular bands on the dorsal surface and about 12 filamentous tentacles at its tip. Hooks arranged in 13-16 rows, each hook higher than broad, with curved apex forming an obtuse angle, accessory tooth, clear triangular area and central streak. Papillae tall, conical and densely packed both at introvert base and round the posterior end. Longitudinal muscle bands 19-21 in number. Retractor muscles two pairs, dorsal pair narrower and weaker than the ventral pair. Rectal caecum absent. Spindle muscle attached posteriorly. Fixing muscle single. Nephridia half as long as the trunk and free at their posterior half.

Remarks : The species is closely allied to P. japonicum and P. stephensoni but differs from the former by the presence of distinct triangular area in the hook which is higher than broad and from the latter by the absence of crescentic area in the hook.

Distribution : This is a circumtropical and subtropical shallow water species extending up to 45° south latitude.

12. Phascolosoma stephensoni (Stephen)


Description : Trunk 28 mm long. Introvert nearly as long as trunk with dorsal irregular brown bands and 20 apical finger-shaped tentacles followed by about 40 complete and incomplete rows of hooks. Each hook strongly curved, pointed at apex, with a small accessory tooth and clear narrow streak having triangular area on its convex side and crescentic area on its concave side. Papillae conical, being densely packed at introvert base and scattered at posterior end. Longitudinal muscle bands 18-28. Retractor muscles two pairs. Rectum short and with caecum. Spindle muscle attached posteriorly. Fixing muscle single. Nephridia three-fourths the trunk length and attached about two-thirds of their length.

Remarks : The species is easily distinguished from other congeners by the clear crescentic area on the concave side of streak of hook.

Distribution : This is a tropical and subtropical species occurring in the intertidal area of the Indo-West Pacific region.

Genus Antillesoma Stephen and Edmonds

13. Antillesoma antillarum (Grube and Oersted)


*Description* : Trunk 20-26 mm long. Introvert about one-third the trunk length, without hooks but with 42-50 tentacles arranged in a single crescent and placed dorsal to mouth. Papillae of trunk larger at the posterior end than those in the middle but smaller than those at its anterior end and also introvert base. Longitudinal muscles grouped into 15-32 frequently anastomosing bands. Retractor muscles two pairs, both fused together immediately after their origin from the same level at middle third of trunk. Spindle muscle attached posteriorly. Contractile vessel with numerous, long villi. Nephridia exceeding half the trunk length, almost fully attached and opening at the same level as anus.

*Remarks* : Shipley (1903) reported two species of *Physcosoma*, viz., *P. asser* and *P. pelma* from Minicoy. But recent studies on their taxonomic status (vide, Cutler and Cutler, 1983) showed that *P. asser* and *P. pelma* are synonymous with *Phascolosoma* (*Antillesoma*) *antillarum* Grube and Oersted. Subsequently the subgenus *Antillesoma* Stephen and Edmonds was elevated to generic rank by Gibbs and Cutler (1987).

*Distribution* : This is a cosmopolitan species found in the tropical and subtropical shallow waters.

**Genus Apionsoma** Sluiter

14. *Apionsoma* sp. [cf. *misakiana* (Ikeda)]

(Figs. 1-5)


*Description* : Trunk 49 mm in length and 5 mm in maximum width; elongated thin-skinned and gradually tapering at both ends. Introvert twice as long as the trunk, with 8 short, filiform tentacles at its tip and about 38 rows of hooks; each hook gently curved, pointed at apex with accessory comb of 5-6 spinelets at base. Papillae variable in size : appreciably taller at introvert base and antero-posterior ends of trunk, being shorter elsewhere. Muscle layers of body wall continuous. Retractor muscles two pairs : anterior and posterior, both originating more or less equidistant from either side of anus. Intestinal coils extending almost to posterior end of trunk. Spindle muscle attached posteriorly. Fixing muscle absent. Nephridia completely free, about one-fourth of the trunk length, with two unequal lobes and opening anterior to anus.

*Remarks* : The specimen examined closely resembles *A. misakiana* (Ikeda), but differs by the reverse mode of origin of retractor muscles and their attachment at the extreme anterior end. It constitutes new locality record for the Lakshadweep.
Figs. 1 - 5, *Apionsoma* sp. (cf. *misakiana*)

1, dissected specimen; 2, anterior region dissected; 3, papilla from hooked region of introvert; 4, papilla from posterior part of trunk; 5, hook from introvert.

Order ASPIDOSIPHONIFORMES
Family ASPIDOSIPHONIDAE
Genus *Aspidosiphon* Diesing

15. *Aspidosiphon steenstrupii* Diesing


*Description*: Trunk 30-50 mm long, thin-skinned in the mid-trunk region and brown to dark brown in colour. Introvert three-fourths the trunk length, tipped with 15-18 tentacles arranged in a semicircular pattern dorsal to mouth, with 35-42 rows straight spines sparsely distributed at its proximal end. Anal shield ungrooved, with small dark brown granules. Caudal shield with complete and incomplete radial furrows. Longitudinal muscles grouped into 18-25 Anastomosing bands visible externally. Retractor muscles single pair. Spindle muscle attached posteriorly. Nephridia about two-thirds as long as the trunk and partly attached to body wall.

*Remarks*: Amongst the material examined, majority have the introvert highly retracted and the caudal shield apparently inconspicuous due to its distortion particularly in the contracted specimens. Further, in many a specimen the retractor muscles originate at the posterior fourth to fifth and only in a few at the posterior sixth of trunk. Likewise, one may encounter variations in the degree of fusion of retractors at different levels of trunk. These variations are, however, not taxonomically significant.

*Distribution*: This is a circum tropical shallow water species excepting for the South Pacific. It is fairly common in the Indo-Pacific area. Previously it was reported from Minicoy only.

**Genus Cloeosiphon Grube**

16. *Cloeosiphon aspergillus* (Quatrefages)


*Description*: Trunk 35-72 mm long, cylindrical and greyish-white to reddish in colour. Introvert always retracted either partly or wholly; arising from the centre of anal shield. Hooks bidentate, each with sharply pointed apical tooth and irregularly branched or unbranched clear area. Anal shield white, round and beset with spirally arranged numerous quadrato or rhomboidal calcareous facets. Papillae densely crowded and largest at both ends of trunk. Longitudinal muscle layer continuous. Retractor muscle single pair, arising from posterior fifth of trunk. Rectum without caecum. Contractile vessel simple and without villi. Fixing muscle single. Nephridia completely attached, dark brown and extending to the posterior end of trunk.

*Remarks*: The shape of the anal shield in this species is unique but depending on the state of contraction at the time of fixation it shows variable shapes like depressed disc, pineapple or roundish.

*Distribution*: This is a coral dwelling species in the tropical shallow water of the Indo-West Pacific. Previously it was reported from Minicoy only.
17. Lithacrosiphon cristatus lakshadweepensis subsp. nov. (Figs. 6-13)

Material examined: Holotype: north-east entrance of lagoon, Agatti, 3 m, dredge, 29.xii.1979; Paratypes: 10 exs., locality data same as for holotype; 8 exs., Kavaratti, from coral at low tide, 2.i.1980; 7 exs., south-east end of reef area, Bangaram, 7.iv.1984.

Location of types: Zoological Survey of India, Calcutta. Regd. No. for Holotype P 3257 / 1 and for Paratypes p 3258 / 1 to p 3260 / 1.

Description: Trunk 12-23 mm long and 6-9 mm wide; light brown to creamy white in colour. Introvert partly retracted in all specimens, 6-10 mm long, about half as long as the trunk; arising ventral to anal shield and just opposite to anus. Tentacles 8-10, small and white. Hooks two types: unidentate and scattered proximally; bidentate, scattered as well as arranged in rows distally. Anal shield conical, calcareous structure with 20-25 longitudinal convergent furrows. Longitudinal muscle layer forming 8-15 frequently anastomosing bands. Retractor muscles single pair, arising from posterior one-seventh of trunk and immediately fusing into a single retractor unit. Rectum with a small medial caecum. Spindle muscle attached at both ends. Fixing muscle absent. Wing muscle present. Contractile vessel without villi. Nephridia almost entirely attached and opening at same level as anus. Gonads well developed.

Remarks: The new subspecies is closely allied to L. cristatus cristatus (Sluiter) but readily differs from it by the number of longitudinal furrows on anal shield (20-25 vs. 30-50), number of longitudinal muscle bands (8-15 vs 13-24), origin of retractor muscles from posterior seventh of trunk vs. posterior fifth of trunk and the length of fused retractor unit (four-fifths to five-sixths vs. three-fifths to three-fourths of their length).

The nominate subspecies exhibits wide tropical distribution usually in the shallow water of the Pacific and western Atlantic Ocean. It is not yet recorded from the Indian Ocean.

On the basis of the above differences coupled with non-occurrence of the nominate subspecies in the Indian Ocean, a new subspecies namely, Lithacrosiphon cristatus (Sluiter) lakshadweepensis is being described.

GENERAL REMARKS

Members of the phylum Sipuncula, as observed during the period of survey conducted at Lakshadweep, constitutes an interesting group. The species conform rather well with their habitats in the archipelago. The material basically represents the elements studied from the intertidal to subtidal levels of the marine ecosystem. These levels extend across an approximate distance of 10 meters from mean high water spring tide level to a depth of about 4 meters. The material, whatever collected up to a certain extent at the subtidal level, has been brought with the aid of dredger of the Port Authority. The habitats of these members are principally formed of sandy bottom, sand pool, coralline limestone, coral boulders and rubbles and reef clefts or interstices or crevices at different levels as mentioned above. Several observations have also been
Figs. 6-13, *Lithacrostophon cristatus lakshadweepensis* subsp. nov.

6, dissected specimen; 7, introvert with anal shield; 8, papilla from hooked region of introvert; 9, papilla from basal portion of anal shield; 10, papilla from mid-trunk region; 11 a, b and 12 a, b uni- and bidentate hooks from introvert; 13 a-f, spines from introvert.
made in relation to their habits. Two major categories are recognised: sand-burrowing and rock-burrowing. Sand burrowing forms belong to the family Sipunculidae. The members of *Sipunculus indicus* are typically sand-burrowing forms about 26-45 cm long, remaining in their vertical refuges. The burrow possesses two apertures on the surface, of which one leads into a straight hole and the other, into an oblique one so as to meet each other and then continue together below the substratum. *Siphonosoma cumanense* generally possesses its vertical burrow with a single aperture on the substratum; but interestingly enough, it has also horizontal burrow immediately below the substratum, as observed at least in the case of two specimens at Kavaratti. Regarding the rock-burrowing forms, certain varieties are recognised according to their shape and structure. Their burrows may be short, straight and posteriorly rounded, as in the case of *Lithacrosiphon cristatus lakshadweepsensis*, or straight and posteriorly wide and rounded, as in *Antillesoma antillarum, Themiste lageniformis* and *Aspidosiphon steenstrupii*, or moderately long and posteriorly wide and rounded, as in *Phascolosoma agassizi*, or long, narrow and posteriorly pointed, as in *Phascolosoma alboineatum* and *P. perlucens*, or exceedingly long and winding, as in *Cloeosiphon aspergillus*. One rock usually harbours separate burrows of two and more species, though in exceptional cases criss-crossing of burrows has also been observed, as in the case of *Cloeosiphon aspergillus*. Mention may further be made of the fact that one sand-inhabiting species, i.e. *Siphonosoma vastum*, and four rock-inhabiting species, viz., *Phascolosoma japonicum, P. nigrescens, P. scolops* and *P. stephensonii*, are known to be usually of non-burrowing habits; all but *Siphonosoma vastum* could be collected by the author from such a habitat. These species occur just on the rock-covered substratum, whether of sand or coral rubbles or in clefts and crevices. Gardiner (1903) referred to the rock-boring and sand-feeding devices of this group from the Lakshadweep and the Maldives.

The species under study represent about 17% of the total Indian Ocean Sipuncula consisting of as many as 107 species. Analysing the data on the material examined and also from the literature in relation to the Lakshadweep fauna, the bulk of species of this archipelago constitutes about 10% of the sipunculan fauna from the tropico-temperate seas of the globe and about 40% of that from the Indian coastal belts. The estimate of the regional break up of the Lakshadweep elements reveals that the number of species occurring in the Western Indian Ocean is 16, while that in the eastern Indian Ocean is less by about 25%. As to the ration of the fauna from the Atlantic Ocean in relation to present material, the species in the north are represented about twice that of the south. The members in the Pacific are distributed in almost equal number in the north and south. Thus, it may be stated that the sipunculans of the Lakshadweep are basically tropical, though these are known to extend further in the temperate zone. Regarding the status of occurrence of the material under study, it may be noted that the majority in the Indo-Pacific are abundant, while *Phascolosoma stephensoni* is rare. Only three species, viz., *Phascolosoma nigrescens, P. scolops* and *Antillesoma antillarum* occur in the circumtropical and subtropical shallow waters. The species endemism is, however, unknown to Lakshadweep. Here it has been observed that *Phascolosoma alboineatum, P. perlucens, Aspidosiphon steenstrupii* and *Cloeosiphon aspergillus* are abundant, while *Phascolosoma agassizi, P. japonicum, P. stephensoni, Siphonosoma vastum* and *Apionsoma* sp. are scarce in distribution.
ACKNOWLEDGEMENTS

The author acknowledges his grateful thanks to the Director, Zoological Survey of India, Calcutta, for providing laboratory facilities during the course of present work and to the Lakshadweep Administration and the Central Marine Fisheries Research Institute for facilities and guidance during the survey work in the islands. Thanks are due to Shri D. K. Mandal, Scientist ‘SD’ of this institute for his valuable help in the preparation of this paper.

SUMMARY

The paper deals with taxonomic account of 17 species of Sipuncula from Lakshadweep. It also provides a key to genera and species along with geographical distribution and discussion on their habits and habitats. A new subspecies, viz., Lithacrosiphon cristatus lakshadweepensis, is described and 4 species, viz., Phascolosoma albolineatum, P. nigrescens, P. japonicum and P. stephensoni are recorded new for the archipelago, of which the latter three are also new to the Indian coast.

REFERENCES


Publisher : Zoological Survey of India, Calcutta.
ECHIURA

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Zoological Survey of India, Calcutta 700 016

INTRODUCTION

In Shipley’s account (1902) on the echiuran animals of Maldive and Laccadive archipelago there are two species namely, Thalassema diaphanes and Anelassorhynchus moebii which were collected from the Minicoy island. This as far as the authors are aware is the first report on the echiurans of Lakshadweep. The only other report on the echiurans of that region is that of Dattagupta and Menon (1965) who described A. moebii from Minicoy island. In the present report 7 species collected by the junior author from these boulder zones of Kavaratti and Minicoy islands of the Lakshadweep group have been described. The identified animals have been deposited to the museum of the Zoological Survey of India, Calcutta.

CLASSIFIED LIST OF SPECIES

Family  ECHIURIDAE
Genus     Echiurus Guerin Menneville, 1831.
1. E. echiurus echiurus (Pallas, 1767)

Family  THALASSEMATIDAE
Subfamily THALASSEMATINAE
Genus     Thalassema Lamarck, 1801.
2. T. diaphanes Sluiter, 1889
Genus     Anelassorhynchus Annandale, 1922
3. A. inanensis (Ikeda, 1904)

Subfamily OCHETOSTOMATINAE
Genus     Ochetostoma Leuckart & Ruppell, 1828.
4. O. palense (Ikeda, 1924)
5. O. capense Jones & Stephen, 1955
6. O. stuhlmanni (Fischer, 1892)

Family  BONELLIDAE
Subfamily BONELLINAE
Genus     Eubonellia Fischer, 1946
7. E. valida Fischer, 1946

* Expired on 2nd April, 1988. This is his last paper.
SYSTEMATIC ACCOUNT

THALASSEMATIDAE: Echiurans with well developed proboscis and with two antero-ventral hooks; without posterior setae; gonostome lateral, located close to the base of the gonoduct; anal vesicles long and tubular.

Key to the subfamilies and genera of the family THALASSEMATIDAE

1. Longitudinal muscles of the body wall continuous without gathering into longitudinal muscle bands ........................................ 2 THALASSEMATINAЕ
   Longitudinal muscles of the body wall gather at intervals forming distinct longitudinal muscle bands .................................. 4 OCHETOSTOMATINAЕ

2. Proboscis deciduous; gonoducts 1 pair; gonostomal lip drawn into a single leaf like structure .............................................................. Arhynchite
   Proboscis adherent; gonoducts 1 - 3 pairs; gonostomal lip variously modified ...... 3

3. Gonoducts 1 - 2 pairs; gonostomal lip simple annular or a pair of flaps .................. Thalassema
   Gonoducts 1 - 3 pairs; gonostomal lip drawn into a pair of spirally coiled filaments Anelassorhynchus

4. Transverse fascicles formed by inner oblique muscles between longitudinal muscle bands; gonoducts in pairs or paired groups .................................................. 5
   Without transverse fascicles; gonoducts 2 - 3 pairs ........................................ 6

5. Gonoducts 1 - 7 pairs; gonostomal lip elongate and spirally coiled Ochetostoma
   Gonoducts 3 - 8 paired groups of 1 - 4 in each group; gonostomal lip drawn into a pair of short spirally coiled filaments Ikedosoma

6. Gonostomal lip not elongate, not spirally coiled but fan shaped or folded Lissomyema
   Gonostomal lip elongate and spirally coiled Listriolobus

1. Echiurus echiurus echiurus (Pallas, 1767)

1767. Lumbricus echiurus Pallas, Miscellania Zoologica, 146-151.

Material: 2 females, 12. 12. 79; near reef edge, Minicoy island.

Description: Both specimens are yellowish brown in colour in the preserved state and proboscis missing. One specimen measures 56 mm in length and the other 50 mm and both measure around 7 mm across the broadest part. Body wall is thick and the papillae on the body wall are irregular in outline except at the posterior end where transverse rows of oval papillae alternate with the rows of smaller ones. Two dark brown ventral hooks are located a little posterior to the mouth. At the posterior tip there are two rows of slightly bent setae; in one specimen 7 in the anterior row and 4 in the
posterior, in the other specimen setae present are 4 in the anterior row and 1 in the posterior. These setae have been found to come out easily from the preserved specimen.

Internally, the intestine has not been preserved well. Gonoducts 2 pairs, small and oval in shape; gonostome basal, simple annular gonostomal lip is borne on a stalk. Anal vesicle could not be seen in any of the two specimens.

**Remarks**: The two specimens have been identified as *Echiurus echiurus echiurus* on the basis of two rows of posterior setae and 2 pairs of gonoducts. *Echiurus echiurus alaskanus* Fisher (1946) has 2 pairs of gonoducts but differs from the present species in having an adherent proboscis and not easily deciduous. In Fisher’s words (1946, p. 228), “All writers who have handled living *Echiurus echiurus* emphasize its habit of dropping the proboscis on the slightest provocation.” The only other *Echiurus* with 2 pairs of gonoducts is the species *abyssalis* in which the gonostome is attached to the gonoduct through the body wall which is not so in the present specimen. This is the first record of a species of the genus *Echiurus* from the Indian coastal water.

**Distribution**: Greenland; Iceland; North Sea and Scandinavian coasts; Alaska; Sea of Okhotsk; Japan; U.W.A. Atlantic coast; Minicoy Island (Lakshadweep).

2. *Thalassema diaphanes* Sluiter, 1889

(Fig. 1, A)


**Material**: 1 female, 9.2.86; eastern ridge, Kavaratti island.

**Description**: The preserved specimen is cylindrical in shape and constricted in two regions. The animal measures 34 mm in length and 6 mm across the broadest part. Body wall is thin and diaphanous; small glassy papillae are sparsely distributed on the body wall. The proboscis is spoon shaped, white in colour and measures 8 mm in length and 5 mm at the broadest part. The proximal half of the proboscis is wider, margin crenulated and inflected ventrally to join at the ventral margin of the mouth. Two ventral hooks are light brown in colour, their tips sharply bent. The posterior end of the trunk is smooth and devoid of papillae. Genital apertures are indistinguishable externally.

Internally, the intestine is found decomposed, nevertheless, the animal appears to be a soft mud dweller as the body cavity is filled with mud and mud pellets with no trace of sand or shingle. Gonoducts are two in number, small and oval in shape and located posterior to the ventral hooks. Gonostome is basal, simple annular gonostomal lip is borne on a short stalk. Anal vesicles are short and tubular.

**Remarks**: The proboscis of the present specimen is shorter in length in comparison to the other descriptions of the species. Crenulation of the margin of the proboscis observed here has not been mentioned in the earlier descriptions. This is the third report on the occurrence of the species in the Indian coastal waters.

**Distribution**: West Africa, Ivory Coast, South Africa, Cape Province; Andaman islands; Maldives and Lakshadweep islands; Bay of Batavia (Indonesia).
3. Anellassorhynchus inanensis (Ikeda, 1904)  
(Fig. 1, B, C)


**Material**: 1 female, 29. 3. 84; south west ridge; 1 female, 30. 3. 84; western reef edge, Kavaratti island.

**Description**: Both specimens are generally grey, posterior end pale grey in colour. The specimen from south west ridge measures 48 mm in length and 15 mm across the broadest part. Its proboscis is 15 mm in length and about 10 mm at the broadest part. The specimen from the reef edge is 35 mm in length and 14 mm across the broadest part. Its proboscis is 16 mm long and 10 mm at the broadest part. Body wall is thick and covered with flattened papillae of irregular outline. Also there are transverse wrinkles in the body wall. The proboscis is greyish white in colour, its lateral margins folded inward to make it tubular in appearance. Proximal ends of the lateral margins are united. Ventral hooks are very small and light brown in colour. Genital apertures are distinguishable externally.

Internally, the foregut appears to be in a highly contracted state. Intestine is held in position by what appear to be innumerable mesenterial strands from the body wall; these are particularly many which emerge from the ventral body wall to attach with the intestine at the junction of the foregut and the siphonal gut. Siphonal intestine and hindgut long. Ring sinus is narrow, neuro-intestinal vessel branches into two before opening into the ring sinus. A rectal caecum is present. Gonoducts 3 pairs and oval in shape; gonostome basal, gonostomal lips drawn into two spirally coiled filaments. Gonoducts are located close to the anterior end, first pair located anterior to the ventral hooks. Anal vesicles are two long brown tubes about 3/4th of the length of the trunk. The tubular vesicles are swollen at some places (Plate 1, C).

**Remarks**: The two specimens conform with the earlier description of the species, in particular the description given by Wesenburg-Lund (1939d). The proboscis of the species is indeed wide, the anterior tip nearly straight with a notch in the middle. This is the first record of the species from the Indian coastal waters.

**Distribution**: Japan; Hawaii; Kavaratti island (Lakshadweep); Annam.

4. Ochetostoma palense (Ikeda, 1924)  
(Fig. 2, A, B)


**Material**: 1 female, 3.1.80; south eastern ridge, Kavaratti Island.

**Description**: The preserved specimen is light brown in colour, pear shaped and measure 41 mm in length without the proboscis and 15 mm across the broadest part. The proboscis is greyish brown in colour measuring 13 mm in length and 7 mm at the broadest part, its lateral margins meet ventral to the mouth. Body wall is moderately thick and covered with minute papillae. Two ventral hooks are small and brown in colour with golden yellow tips. Genital pores are indistinguishable externally.
Longitudinal muscles gather into 15 bands clearly seen in the anterior half of the trunk; there are fascicles between the longitudinal muscle bands.

Internally, the foregut is short. The neuro-intestinal vessel is stout and single throughout. Gonoducts 3 pairs, the first pair located anterior to the ventral hooks. The third pair is the largest measuring 14 mm in length. Gonostome basal, gonostomal lip drawn into a pair of long filaments. Anal vesicles are two long tubes, about 3/4th of the length of the trunk. A rectal coecum and interbasal muscle are absent.

Remarks: *O. palense* of the present report differs from the holotype (Ikeda, 1924) in the structure of the proboscis. The species is known only from the holotype in which the proboscis is slender and about 2 mm in breadth. In the present specimen the proboscis is 7 mm at its broadest part. The species of *Ochetostoma* with 3 pairs of gonoducts and 15 longitudinal muscle bands are *erythrogrammon, stuhlmanni* and *palense*. In *O. erythrogrammon* a rectal caecum is present, filamentous gonostomal lips are spirally coiled. In *O. stuhlmanni* the proboscis is extremely small in size (1/20 to 1/10 of the trunk) and a large rectal caecum is present. This is the first record of its occurrence since the discovery of the species (Type locality: Misaki, Palau Is., Japan).

Distribution: Palau island (Japan); Kavaratti island (Lakshadweep).


(Fig. 2, C, D, E)


Material: 1 female, 9.2.86; western ridge, Kavaratti Island.

Description: The specimen is dirty brown in colour in the preserve state. Trunk is sausage shaped and measures 43 mm in length and 20 mm across the broadest part. Proboscis is 19 mm in length, fleshy, gradually narrowing anteriorly and somewhat tubular in shape by ventral inflection of its lateral margins. Proximal 1/3rd of the lateral margins are broken in the form of a series of ridges. Across the broadest part the proboscis is nearly 10 mm wide from one edge to another. Body wall is thick and covered with sparsely distributed papillae. Longitudinal muscle bands are 10 in number with transverse fascicles between the bands. Ventrally about 5 mm posterior to the mouth 2 very small dark brown hooks with golden yellow tips are present. Genital pores are indistinguishable.

Internally, the posterior part of the intestine is poorly preserved and the intestine is filled with mud shingle and black sand. Gonoducts 2 pairs, pear shaped and located posterior to the ventral hooks; the posterior pair is much larger in size. Gonostome basal, gonostomal lip drawn into two spirally coiled filaments. Dorsal vessel is robust, neuro-intestinal vessel is single throughout, and the ring sinus is narrow. Anal vesicles are two brown tubes about 15 mm in length and 1.5 mm in breadth and studded with excretory funnels.

Remarks: The proboscis in the present specimen is proportionately larger compared with the original description of the species (Jones & Stephen, 1955); also "tight ridges" are confined to the proximal half of the proboscis. The species was originally reported from the Cape Province (S. Africa) and later reported from Durban Bay. This is the first record of its occurrence from the Indian coastal waters.
**Distribution**: South Africa, Cape Province, Durban Bay; Kavaratti island (Lakshadweep).

6. *Ochetostoma stuhlmanni* (Fischer, 1892)

(Fig. 2, F)


**Material**: 1 female, 8. 2. 86; western ridge, Kavaratti Island.

**Description**: The preserved specimen is light brown in colour, oval in shape and with prominent but very small proboscis. The specimen measures 16 mm in length and 12 mm across the broadest part. Its proboscis is 3 mm in length and 2 mm in breadth which surrounds the mouth in the form of a collar. The proximal ends of the two lateral margins of the proboscis are produced into two longitudinal processes. Body wall is thick with transverse wrinkles. Small papillae are prominent at the anteriormost tip of the trunk. Oval papillae are arranged in transverse rows at the posterior end. The posterior tip of the trunk is swollen in the form of a cloacal bulb which is fleshy and white in colour. Ventral hooks are very small. Longitudinal muscles gather into 16 bands with transverse fascicles between the bands.

Internally, the intestine is very long and filled with mud, shingle and sand together with gastropod nymphs. Prointestine is small. Dorsal vessel is stout, neuro-intestinal vessel is single throughout. Gonoducts 3 pairs, first pair located anterior to the ventral hooks. Gonostome basal, gonostomal lip drawn into two spirally coiled filaments. Anal vesicles are two long tubes bearing sessile excretory funnels. A large rectal caecum is present.

**Remarks**: The species of *Ochetostoma* which has 14 - 16 longitudinal muscle bands and 3 pairs of gonoducts of which the first pair is anterior to the ventral hooks are *stuhlmanni, palense, erythrogrammon* and *caudex*. In the species *palanse* the proboscis is around 1/3 of the length of the trunk and rectal caecum and interbasal muscle are absent. In *erythrogrammon* and *caudex* the proboscis is 1/3 to 3/4 of the length of the trunk and both rectal caecum and interbasal muscle are present. In *stuhlmanni* the proboscis is rudimentary and only the rectal caecum is present.

**Distribution**: Zanzibar; Pangani; Society island; Kavaratti island (Lakshadweep).

**Key to the species of the genus Ochetostoma**

1. With 7 pairs of gonoducts..............................................................................................................2
   With 5 pairs of gonoducts or less.................................................................................................3

2. First pair of gonoducts located anterior to the ventral hooks (psetetal) and 6 pairs postsetal; 12 longitudinal muscle bands (lmb).................................................................
   ....................................................................................................................... *zanizibarense* Stephen & Robertson, 1952
   All 7 pairs of gonoducts postsetal; 7 lmb ......................... *senegalense* Stephen, 1960

3. Gonoducts 5 pairs .......................................................................................................................4
   Gonoducts 4 pairs or less............................................................................................................5
Fig. 1. - A, Thalassema diaphanes, ventral view of female x 1½.
B-C: Anelassorhynchus inanensis: B, ventral view of female x 1, C, internal morphology; D-F, Eubonellia valida: D, ventral view of female x 1½, E, gonoduct, F, anal vesicles.

4. 3 pairs of gonoducts presetal and 2 pairs postsetal; 19 lm. hornelli (Prashad, 1920)

1 pair of gonoducts presetal and 4 pairs postsetal, 5th pair of gonoducts may be vestigeal; 10-11 lm. bombayensis (Prashad & Awati, 1929)
5. Gonoducts 4 pairs .......................................................... 6
   Gonoducts 3 pairs or less .............................................. 7
6. 2 pairs of gonoducts presetal and 2 pairs postsetal; 10 lmb. ..... decameron (Lanchester, 1905)
   1 pair of gonoducts presetal and 3 pairs postsetal; 20 lmb ..... kempi (Prashad, 1919)
7. Gonoducts 3 pairs, 1 pair presetal .................................. 8
   Gonoducts 2 pairs with or without presetal gonoducts .......... 16
8. With well developed proboscis ........................................ 9
   Proboscis rudimentary or lacking .................................. 14
9. Proboscis 4-6 times the length of the trunk; 17-18 lmb ....... griffini (Wharton, 1913)
   Proboscis shorter than trunk; 12 - 18 lmb ........................ 10
10. Papillae on the body wall lie on raised ridges corresponding to the lmb; proboscis 1/3 to 1/2 of the trunk length; 16 - 18 lmb caudex (Lampert, 1883)
    Papillae on the body wall lie scattered; with or without rectal caecum or interbasal muscle .......... 11
11. With rectal caecum and interbasal muscle .......................... 12
    Without rectal caecum and interbasal muscle .................. 13
12. 12 - 13, occasionally 11 - 14 lmb; neuro-intestinal vessel branching into two before opening into ring sinus australiense Edmonds, 1960
    14 - 16 lmb; neuro-intestinal single throughout................ erythrogrammon Leuckart & Ruppell, 1828; sorbillans (Lampert, 1883)
13. Anterior tip of the proboscis with a notch in the middle; 18 lmb indosinense Wesenburg-Lund, 1939
    Proboscis anteriorly truncated: 15 lmb palense (Ikeda, 1924)
14. Proboscis rudimentary in the form of a collar; rectal caecum large; interbasal muscle absent; 15 - 16 lmb stuhlmanni (Fischer, 1892); leptodermon (Lampert, 1892)
    Proboscis lacking ...................................................... 15
15. Rectal caecum present; interbasal muscle absent; 21 - 22 lmb multilineatum (Fischer, 1914)
    17 - 18 lmb kokotoniense (Fischer, 1892)
16. 1 pair of gonoducts presetal and 1 pair postsetal; skin transparent; 18 lmb kefersteini (ten Broeke, 1925)
    All gonoducts postsetal .............................................. 17
17. With well developed proboscis................................................................. 18
   Proboscis lacking; rectal caecum and interbasal muscle present; 14 lmb...........
   ........................................................................................................... manjuyodense (Ikeda, 1905)
18. Circumanal area not modified ............................................................... 22
   Circumanal area modified..................................................................... 19
19. Smooth circumanal ring; 8 lmb..................................................... arkati (Prashad, 1935)
   Circumanal area variously modified; 7 - 13 lmb.................................. 20
20. Anal disc with subulate papillae......................................................... 21
   Anal disc with annular frills; 7 lmb........ septemyotum DattaGupta & Menon, 1963
   Without oesophageal diverticulum; trunk in the form of a narrow stem posteriorly;
   13 lmb ............................................................................... m ercator Wesenburg-Lund, 1954
22. Longitudinal muscle bands (lmb) less than 10 .................................. 23
   Longitudinal muscle bands (lmb) more than 10.................................... 25
23. Anal vesicles sac like; 7 - 8 lmb......................................................... formosulum (Lampert, 1883)
   Anal vesicles tubular; with or without inter-basal muscle ...................... 24
24. Proboscis margin with distinct broken ridges; interbasal muscle present; 7 - 8 lmb.........
   ........................................................................................................... capense Jones & Stephen, 1955
   Proboscis thick and fleshy; body wall with elliptical gland; interbasal muscle
   absent; 8 lmb.................................................................................. octomyotum Fisher, 1946
25. 10 - 21 lmb; with or without rectal coecum ........................................ 26
   13 lmb; proboscis margin thick......................................................... pellucidum (Fischer, 1895)
26. With interbasal muscle; 16 - 21 lmb................................................... 27
   Without interbasal muscle................................................................... 28
27. Rectal caecum absent; 16 - 17 lmb...................................................... edax Fisher, 1946
   Rectal caecum present; 18 - 21 lmb.................................................. myersae Edmonds, 1963
28. 18 - 19 lmb....................................................................................... pumicea Dartnell, 1976
   10 - 11 lmb....................................................................................... hupferi (Fischer, 1892)

The present key has been prepared almost entirely on the basis of the number of
muscle bands, number and location of the gonoducts vis a vis the ventral hooks, and the
presence or absence of certain characters like rectal coecum and interbasal muscle.
DattaGupta & Menon (1971) listed 27 species of the genus out of the 32 species listed
here. They have also mentioned the special problem about distinguishing the species
caudex, stuhlmanni, leptodermon, kokotoniense, sorbillans and griffini from the species erythrogrammon. Taxonomic characters which have been used here to distinguish the species are not available uniformly for all the species. Nevertheless, efforts have been made to reasonably separate the species on the basis of the available taxonomic information.

7. Eubonellia valida Fisher, 1946
(Fig. 1, C, D, E)


Material : 1 female, 8. 2. 86; western ridge, Kavaratti Island.

Description : The preserved specimen is oval in shape and greyish white in colour measuring 30 mm in length and 16 mm across the broadest part. The robust proboscis is separated from the trunk; it is fleshy and white in colour measuring 24 mm in length and over 15 mm at the anterior tip which is the broadest part. The anterior margin of the proboscis is wavy and with two small lobes. The lateral margins fold inward making the proximal half of the proboscis somewhat tubular. Ventral hooks are absent. Body wall is thick and covered with flattened papillae of irregular outline. Also there are transverse wrinkles in the trunk. Near the junction of the proboscis and the trunk genital pore is distinguishable in the form of a pit.

Internally, the intestine which is preserved unsatisfactorily is filled with pieces of coralline rocks and black sand. Single gonoduct is cylindrical and broad; gonostome terminal, gonostomal funnel borne on a narrow stalk: anal vesicles are two wide sacs bearing sessile funnels and opening into the cloacal chamber by a single opening.

Remarks : The species E. valida is known on the basis of holotype only and the present specimen is the first record of its occurrence since its discovery (Fisher, 1946 : Type locality, Sea of Okhotsk, off the coast of Sakhalin Is.). Although the present animal generally conforms with the description of the holotype, the proximal half of the proboscis in the holotype does not fold in the form of a tube. The junction of the proboscis and the trunk is, however, considerably narrow in the holotype. The anal vesicles in the holotype are in the form of an axial bladder from which a few dendritic processes arise. The voluminous sac of the present specimen can be compared with the axial bladder in the holotype but the proximal dendritic branches could not be seen here.

Distribution : Sea of Okhotsk; East coast of Sakhalin island; Kavaratti island (Lakshadweep).

GENERAL REMARKS

Echiurans of the Lakshadweep archipelago constitute an interesting group as none of the 7 species of Echiura reported here has been found to occur in the coastal waters of the Indian mainland. Before the present account 25 species have been reported from Indian coastal waters of which 20 species have been collected from the mainland coasts and 6 from the Andaman and Nicobar islands, the species Acanthobonellia pirotansis (Bonellididae) occurring both in Pirotan island (Gulf of Kutch) and Port Blair (Andaman island). The 5 remaining species reported from the Andaman group of islands
Fig. 2. - A - B, Ochetostoma palense: A, ventral view of female x 1\(\frac{1}{2}\), B, internal morphology, C - E, Ochetostoma capense: C, ventral view of female x 1\(\frac{1}{2}\), D, proboscis, lateral view, E, gonoduct, F, Ochetostoma stuhlmanni, ventral view of female x 3.

av - anal vesicle, dv - dorsal vessel, gd - gonoduct, ni - neuro intestinal vessel, Lpr - proboscis, vh - ventral hooks, vn - ventral nerve cord, vv - ventral vessel.
are Thalassema diaphanes, Ochetostoma erythrogrammon, O. kempi, O. australiense (Thalassematidae) and Bonellia minor (Bonellidae). T. diaphanes happens to be the only echiuran which has been found to occur in both the Andaman and the Lakshadweep group of islands.

Six of the 7 Lakshadweep echiurans are new records from the Indian coastal waters and a species of the genus Echiurus is reported here for the first time from warmer sea. The species of Echiurus have been generally reported from the cold seas of the Arctic and the Antarctic regions. The type locality of the species Echiurus abyssalis is the Isle of Capri (1100 - 1500 m) and the species has been reported from the west coast of Ireland besides a few regions of the Mediterranean. Echiurus echiurus echiurus of the present list has been reported by many authors, all from the arctic waters. The occurrence of the species in the Lakshadweep waters is indeed interesting.

T. diaphanes has been reported earlier from the Andaman island (Prashad, 1935) and from the Maldive and Lakshadweep (Shipley, 1899, 1902). The species has also been reported from the coasts of the West and South Africa and Indonesia. O. capense and O. stuhlmanni were originally reported from the coastal waters of the South and South-Eastern Africa. The latter species was later found to occur in the Society island and Pangani in the South Pacific. The type localities of O. palense and A. inanensis are Misaki and Naha respectively in Japan. A. inanensis has been found to occur in Hawaii and Annam besides Japan, but O. palense of the present report is the first record of its occurrence since its discovery, also the first record of occurrence in warm sea. Similarly, E. valida, originally described from the Sea of Okhotask (Fisher, 1946) and later reported from the same region (Zenkevitch, 1958) is the first record of occurrence here in warmer waters.

The islands in the Lakshadweep group with their extensive lagoon and coralline rocks seem to be particularly suitable for the animals of phyla Echiura and Sipuncula to live and multiply. Echiurans of the present report have been collected from the rocky boundary wall (boulder zone in Gardiner’s note: Shipley, 1902) of the lagoon facing the island. Collection of animals from the boulder zone facing the open sea where large breakers continuously strike the rocky wall is hazardous. It can nevertheless be assumed that more echiurans will come to our knowledge from this area if intensive searches are made.

SUMMARY

Seven species of phylum Echiura collected from Kavaratti and Minicoy islands of the Lakshadweep archipelago have been listed and described. They belong to the genera Echiurus (Echiuridae), Thalassema, Anelassorhynchus, Ochetostoma (Thalassematidae) and Eubonellia (Bonellidae). Six of the 7 species are new records from Indian coastal waters.

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REFERENCES


CRUSTACEA : STOMATOPODA

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Zoological Survey of India, Calcutta - 700 016.

INTRODUCTION

Though zoo-geographically unique, the oceanic islands of Lakshadweep are least explored and their stomatopod fauna in particular is little known. In the first comprehensive study of these islands, Lanchester (1903) worked out Gardiner's material of Stomatopods and reported *Pseudosquilla ciliata* and 15 varieties of *Gonodactylus chiragra* of which the following are the valid species from Minicoy: *Pseudosquilla ciliata*, *Gonodactylus platysoma*, *G. affinis*, *G. falcatus*, *G. smithii*. Later Shanbhogue (1969, 1971a and 1971b) added *Alima hyalina*, *Gonodactylus chiragra* and *Heterosquilla jonesi* n.sp. all from Minicoy only. Nagabhushanam and Rao (1972) listed *Gonodactylus spinosus*, *Odontodactylus brevirostris* and *Pseudosquilla oculata* from Minicoy. These same have been excluded from this report for want of material confirmation.

Thus, all the earlier studies of stomatopods were from Minicoy alone. Zoological Survey of India made some faunistic surveys in the recent past covering a wider section of these islands during which stomatopods were collected from Minicoy, Kavaratti and Agatti. A study of the material now added *Gonodactylus mutatus*, *G. viridis*, *G. insularis* and *G. minikoiensis*, n.sp. and *G. arabica*, n.sp. Thus in all 13 species of stomatopods from these islands are known till date. In the present paper, while the new species have been fully described and figured, brief descriptions of the other species from Lakshadweep with keys for identification, have been provided.

LIST OF STOMATOPODA KNOWN FROM LAKSHADWEEP

<table>
<thead>
<tr>
<th>Order</th>
<th>STOMATOPODA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superfamily</td>
<td>GONODACTYLOIDEA Giesbrecht, 1910</td>
</tr>
<tr>
<td>Family</td>
<td>GONODACTYLIDAE Giesbrecht, 1910</td>
</tr>
<tr>
<td>Genus</td>
<td>Gonodactylus Berthold, 1827</td>
</tr>
</tbody>
</table>

(Affinis Group)

1. *Gonodactylus affinis* de Man, 1902
2. *Gonodactylus minikoiensis*, new species
   (Chiragra Group)
4. *Gonodactylus arabica*, new species
5. *Gonodactylus chiragra* (Fabricius, 1781)
6. *Gonodactylus platysoma* Wood-Mason, 1895
7. *Gonodactylus smithii* Pocock, 1893 (Falcatus Group)
8. *Gonodactylus falcatus* (Forskall, 1775)
10. *Gonodactylus mutatus* Lanchester 1903

Family PSEUDOSQUILLIDAE Manning, 1977
Genus *Pseudosquilla* Dana, 1852

11. *Pseudosquilla ciliata* (Fabricius, 1787)

   Superfamily SQUILLOIDEA Latreille, 1803
   Family SQUILLIDAE Latreille, 1803
   Genus *Alima* Leach, 1818

12. *Alima hyalina* Leach, 1818

   Superfamily LYSIOSQUILLOIDEA Giesbrecht, 1810
   Family LYSIOSQUILLIDAE Giesbrecht, 1810
   Genus *Heterosquilloides* Manning, 1966

13. *Heterosquilloides jonesi* (Shanbhogue, 1971)

Key to Species of STOMATOPoda

1. Propodi of posterior three maxillipeds slender; telson with distinct median carinae. 2
   - Propodi of posterior three maxillipeds broad; telson lacking distinct median carinae. .......................................................... (Superfamily LYSIOSQUILLOIDEA)

   Dactylus of raptorial claw not inflated basally; endopod of walking legs slender; uropodal endopod without proximal fold on inner margin .................................................................(Family LYSIOSQUILLIDAE)

   Four intermediate denticles on telson................. (Genus *Heterosquilloides*)

   Rostrum large, without apical spine; dactylus of raptorial claw with four teeth...... .................................................................*H. jonesi*

2. Only two denticles on telson.......................... (Superfamily GONODACTYLOIDEA)
   - Four or more denticles on telson..........................(Superfamily SQUILLOIDEA)

   Body carinate; propodus of raptorial claw pectinate on opposable margin..........
   ..............................................................................................(Family SQUILLIDAE)

   Eyes large, cornea bilobed; dactylus of raptorial claw with 5-6 teeth; lateral processes of 6th and 7th thoracic somites not bilobed ............(Genus *Alima*)
Dactylus of raptorial claw with six teeth; basal prolongation of uropod with two rounded lobes between distal spines.................................................A. hyalina

3. Dactylus of raptorial claw slender, not basally inflated and with teeth on opposable margin.............................................................(Family Pseudosquillidae)

Cornea of eye cylindrical; rostrum ovate; dactylus of raptorial claw with three teeth .................................................................(Genus Pseudosquilla)

Rostrum without apical spine; carapace lacking a pair of large and dark circles....... .................................................................P. ciliata

— Dactylus of raptorial claw stout, basally inflated and no teeth on opposable margin. .............................................................................................................................................................................................................................................................................................................(Family Gonodactylidae)

Cornea of eye subglobular; rostrum with apical spine......(Genus Gonodactylus)

   i. Mid-dorsal carinae three on telson.......................... ii
   — Mid-dorsal carinae five on telson ............................(Falcatus Group) viii

   ii. Ocular scales very large, apices rounded; body size large...(Chiragra group) iii
   — Ocular scales small, apices angled; body size small...........(Affinis Group) vi

   iii. Marginal teeth on telson three pairs .............................. iv
   — Marginal teeth on telson two pairs...............................G. platysoma

   iv. Anchor on telson present ................................................. v
   — No anchor on telson.........................................................G. arabica, n. sp.

   v. Anterolateral angles of rostrum rounded, mid-dorsal carinae swollen ......
      ..........................................................................................G. chiragra.
   — Anterolateral angles of rostrum acute, mid-dorsal carinae slender....G. smithii.

   vi. Anterolateral angles of rostrum acute, no anchor on telson ............ G. affinis.
   — Anterolateral angles of rostrum not acute, anchor on telson present ...... vii

   vii. Rostrum with obtuse anterolateral margin; median and accessory median carinae of telson unarmed posteriorly...............G. minikoiensis, n. sp.
   — Rostrum with acute anterolateral margins; median and accessory median carinae of telson armed posteriorly.................G. viridis.

   viii. No median carinule on sixth abdominal somite ...................... ix
   — Median carinule present on sixth abdominal somite...............G. falcatius.

ix. Dorsal carinae of telson slender; intermediate teeth of telson pointed........
    ..................................................................................G. insularis.
   — Dorsal carinae of telson inflated; intermediate teeth of telson bluntG. mutatus.
SYSTEMATIC ACCOUNT

1. *Gonodactylus affinis* De Man


**Material examined** : Nil. (Record and description based on references listed above.)

**Description** : Anterolateral angles of rostrum acute. Ocular scales small. Carinae of 6th abdominal semite tubular, each ending in a posterior spinule. Middorsal carinae on telson 3 pairs; median variously inflated, ending in posterior spine; accessory median short, with a posterior spinule. Marginal teeth on telson 3 pairs: submedians with movable apices, denticles many; intermediate with two denticles; lateral distinct but small.

**Remarks** : Manning (1968) described *Gonodactylus segregatus* as a distinct species based on material from Madagascar and Lanchester’s (1903) material of *Gonodactylus chiragra* var. *segregatus* from the Laccadives. Later Manning (1978) transferred all the above material under *G. affinis*.

**Distribution** : Widely distributed from Madagascar to Indonesia and South China Sea.

2. *Gonodactylus minikoiensis*, new species

(Fig. : 1 a - d)

**Material examined** : Holotype, female, TL 30 mm; Minicoy, Northwest of Viringili; D. R. K. Sastry; 17.2.1986; Z.S.I., Reg. No. C4141/2

**Description** : Rostral plate slightly broader than long, anterior margin concave, anterolateral angles obtuse, lateral margins divergent. Ocular scales small, apices angled. Dactylus of raptorial claw slender, outer margin basally swollen, tip bent inwards. Sixth abdominal somite with 6 sharp carinae, each ending in a slender posterior spine, spines of lateral carinae turned inwards. Telson slightly broader than long, three mid-dorsal carinae present, none armed posteriorly, median sharper and slender, accessory medians converge under posterior end of median to form U-shaped anchor; three pairs of marginal teeth present - laterals poorly formed but distinct, intermediates more slender, submedians with movable apices; sub-median denticles many and 2 sharp intermediate denticles present. Proximal segment of uropodal exopod with 11 movable spines on outer margin, distal segment fan-shaped, no lobes between two arms of protopod, endopods pyriform.

**Colour** : Body colour whitish. Distinct black spots present as follows : 2 medially on the sixth thoracic somite, 2 medially and 2 laterally on the first abdominal somite, 2 laterally on 2-5 abdominal somites. A crimson colour patch present distally on the inner margin of merus of claw.

**Discussion** : *G. minikoiensis* is assigned to the ‘Affinis Group’ because of small and triangular shaped ocular scales and small body size. It differs mainly from *G. affinis*
in having a more slender median carina on telson and concave anteromedial margin of rostral plate and from G. viridis in having obtuse anterolateral angles of rostrum and well defined lateral teeth on telson. The new species also resembles G. smithii of the Chiragra Group in possessing a crimson coloured patch on the inner margin of merus of claw and U-shaped anchor on the telson. However, it differs from G. smithii in being much smaller in body size, much smaller and angled ocular scales and an unarmed median carina on telson.

Fig. 1. **Gonodactylus minikoensis** n. sp., Holotype, female; TL 30 mm. (a) Full specimen; (b) Rostral plate and ocular scales; (c) Raptorial claw; (d) 6th abdominal somite, telson and uropods.

**G. minikoensis** can also be distinguished from all other members of the genus by the conspicuous black spots as depicted under colour description above.

**Measurements**: Holotype, female: Total length 30 mm; carapace length 6 mm; rostral plate: length 2.5 mm, width 3 mm; Telson: length 4 mm, width 5 mm; abdominal width 6 mm.

**Etymology**: The new species is named after the type locality Minicoy in the Lakshadweep.

**Distribution**: Known only from the type locality-Minicoy, Lakshadweep.

3. **Gonodactylus viridis** Serene, 1954

1954. **Gonodactylus chiragra** var. **viridis** Serene, Memoires de l' Institut Oceanographique de Nha Trang, 8 : 6, 7, 10, 74, 75, 76, fig. 13-3.
Material examined: 1 ♂, TL is mm; Kavaratti; D. R. K. Sastry; 29.3.1984.

Description: Rostral plate as long as broad, apical spine relatively short, anterolateral angles broadly rounded. Ocular scales small, apices rounded. Sixth abdominal somite with 6 moderately inflated carinae, each ending in a spine posteriorly. Telson as long as broad, mid-dorsal carinae three, accessory medians very short fusing posteriorly to form anchor, a pair of knobs present on anterior margin. Posterior margin with three pairs of blunt marginal teeth, submedian with movable apices, two sharp intermediate denticles and many submedian denticles present. Proximal segment of uropodal exopod with 10 movable spines on outer margin.

Remarks: The present female specimen (TL 15 mm) is perhaps the smallest representative of G. viridis so far recorded. It closely resembles G. chiragra but differs from the later by small body size, smaller and angled ocular scales and a pair of knobs on telson.

Distribution: Vietnam (Fene, 1954) and Thailand (Manning, 1978). The present record from the Lakshadweep is the first from the Indian waters.

4. Gonodactylus chiragra (Fabricius)
(Fig. 2a.)
1781. Squilla chiragra Fabricius, Species Insectorum, 1: 515.
1913. Gonodactylus chiragra : Kemp. Mem. Indian Mus. 4: 155, pl. 9, fig. 107

Material examined: Nil (Record and description based on references, listed above.)

Description: Anterolateral angles of rostrum rounded. Ocular scales large. All six carinae of 6th abdominal somite broad, each ending in a posterior spine. Telson broader than long, mid-dorsal carinae broad, anchor present. Marginal teeth on telson 3 pairs: submedian with movable spines, intermediates broad and blunt, laterals ill formed. Terminal part of dactylus of raptorial claw slender and the tip inturned.

Remarks: Lanchester (1903) reported 15 varieties of G. chiragra none of which belong to G. chiragra. Shanbhogue (1969) reported this species from Minicoy.

Distribution: Widely distributed from Western Indian Ocean to Japan.

5. Gonodactylus platysoma Wood-Mason
(Fig. 2b)

Material examined: 4 ♂ (TL 51-84.5 mm), 1 ♂ (TL 77 mm); Kavaratti, from coral; D. R. K. Sastry; 22.3.1984 and 7.2.1986.

Description: Body depressed. Ocular scales large, anterior margins truncate, anterolaterally angled. Rostrum as long as broad, anterior margin concave, median spine relatively short, anterolateral angles obtuse. Sixth abdominal somite with 6 carinae, only the laterals with slender posterior spines. Dorsal carinae of telson inflated, none
armed posteriorly, anchor absent. Two pairs of marginal teeth on telson-laterals absent, intermediates slender and submedianians with movable spines. Submedian denticles on telson many, intermediates two. Uropodal exopod with 11 movable spines on outer margin.

**Remarks**: The specimens examined here agree well with descriptions in literature except that no colour markings are present and the anterolateral angles of ocular scales in the female specimen is rounded. *G. platysoma* can chiefly be separated from *G. chiragra* in the absence of lateral teeth and anchor on telson and from *G. smithii* in having broader anterolateral angles on rostrum.

**Distribution**: Indo-Pacific from Western Indian Ocean to Japan.

6. *Gonodactylus smithii* Pocock
(Fig. 2d.)


**Material examined**: 1 ♂ (TL 30mm); Kavaratti, reef area; D. R. K. Sastry; 9.2.1986. 1 ♂ (TL 27 mm), 2 ♀ (TL 31 and 42 mm); Agatti, from coral in Lagoon; D. R. K. Sastry; 4-8.4. 1984.

**Description**: Rostrum slightly broader than long, median spine relatively short, anterior margin concave, anterolateral angles slightly acute. Ocular scales large, truncate. Sixth abdominal somite with 6 sharp carinae, each ending in a posterior spine. Telson slightly broader than long, with a sharp median carina, a pair of short anteriorly positioned submedianians and a pair of accessory medianians forming an anchor. Marginal teeth on telson 3 pairs; submedianians with movable apices, intermediates sharp, laterals poorly formed. Submedian denticles on telson numerous and two sharp intermediate denticles.

**Remarks**: Body colour faded. The characteristic crimpson coloured patch on the inner margin of merus of claw is clearly visible in only one of the specimens. The total length of males 27 and 30 mm and females 31 and 42 mm.

The acute anterolateral angles of rostrum, slender median carinae of telson and the crimson coloured patch on the inner margin of merus of claw distinguish this species from *G. chiragra* and *G. platysoma* also known from this area.

**Distribution**: Indo-Malayan waters from eastern Arabian sea to Vietnam. Lanchester (1903) had reported it from Maldives and Shanbhogue (1969) from Minicoy.

7. *Gonodactylus arabica*, new species
(Fig. 2e & 3a-d)

**Material examined**: Holotype, 1 ♀, Kavaratti; D. R. K. Sastry; 8.2.1986; Z. S. I. Reg. No. C4 142/2

**Description**: Rostral plate slightly broader than long, anteromedially concave, anterolaterally obtuse, lateral margins divergent, median spine relatively short. Ocular scales large, rectangular. Carapace much longer than broad, anterolateral angles projected
Fig. 2. *Gonodactylus arabica* n. sp., Holotype, female; TL 44 mm. (a) Full specimen; (b) Rostral plate and ocular scales; (c) Raptorial claw; (d) 6th abdominal somite, telson and uropods.

Beyond rostral base, narrowed anteriorly. 6th abdominal somite with 6 broad and variously shaped carinae, each ending in a blunt posterior spine. Telson longer than broad, three pairs or marginal teeth present, submedians with movable apices; two sharp intermediate and many hairy submedian denticles present; three swollen mid-dorsal carinae present, median longer, none armed posteriorly, anchor absent. Uropodal exopod with 12 movable spines on outer margin of proximal segment; distal segment fan-shaped; no lobes between two arms of protopod; endopod pyriform.

**Colour**: Body colour creamy white. Well defined black spots present as follows: 2 medially and 2 laterally on the 6th thoracic somite, and 2 laterally from 1st to 5th abdominal somites. Distal end of dactylus of raptorial claw including a part of propodus pinkish.

**Measurements**: Holotype (female), Total length 44 mm; Carapace: length 10.5 mm, width 8 mm; Rostral plate: length 3.5 mm, width 4 mm; Telson: length 8.5 mm, width 7.5 mm.
Fig. 3.  Rostral plate and ocular scales. (a) Gonodactylus chiragra; (b) G. plrysoma. Male, TL 67 mm; (c) G. acutirostris; (d) G. smithiii; (e) G. arabica n. sp., Holotype. (Figures a,c, and d after Manning and Lewinsohn 1986).
Etymology: The new species is named after the Arabian Sea in which the type locality is situated.

Discussion: Based on large body size (TL 44 mm) and presence of three mid-dorsal carinae on telson, the new species is assigned to the 'Chiragra group' of the genus Gonodactylus. It resembles G. chiragra and G. smithii in having large and rectangular ocular scales but differs from both by the absence of anchor on telson. Further the anterolateral angles of rostrum are somewhat more acute in G. smithii while they are rounded in G. chiragra. In G. platysoma there are only two marginal teeth on telson, the anterolateral angles of rostrum are rounded and the ocular scales much larger. The new species also resembles G. acutirostris in the absence of anchor on telson but the anterolateral angles of rostrum are acute and spiniform and the ocular scales somewhat narrow and pointed in G. acutirostris (fig. 2c). The new species can further be easily distinguished by conspicuous black spots on the dorsal surface as described under colour description.

Distribution: Known only from the type locality-Kavaratti, in the Lakshadweep.

8. Gonodactylus falcatus (Forskall)

Material examined: 2 Males (TL 25 & 26 mm); Minicoy, from Lagoon; D. R. K. Sastry; 14.2.86.

Description: Anterolateral angles of rostrum rounded, ocular scales small, erected and the apices rounded. Sixth abdominal semite with 6 variously inflated carinae, each ending in a posterior spine, median carinule present. Telson with a cluster of 5 mid-dorsal carinae, medians and submedians spined posteriorly. Knob on telson strongly bilobed. Marginal teeth on telson 3 pairs, submedians with movable apices; submedian and intermediate teeth with strong carinae. Basal prolongation of uropod with a single lobe on inner margin of outer spine.

Remarks: The presence of a median carinule on the 6th abdominal semite and a distinct bilobed knob on telson will immediately distinguish G. falcatus from all other members of the genus.

Distribution: Widely distributed in the Indo-Pacific. From the Indian waters it has so far been reported from Lakshadweep (Lanchester, 1903; Shanbhogue, 1969), Andaman and Nicobar (Kemp, 1913) and Bombay, Chhapgar and Sane, 1968), Rameswaram (Handerson, 1893; Tattersall, 1906).

9. Gonodactylus insularis Manning and Reaka

Material examined: 1 ♂ and 1 ♀; Minicoy, from Lagoon; D. R. K. Sastry; 14.2.1986.

Description: Rostrum slightly longer than broad, median spine relatively short, anterior margin straight, anterolaterals angles broadly rounded. Ocular scales small, apices angled. Sixth abdominal somite with six variously inflated carinae, each with a
strong posterior spine. Telson as long as broad, dorsal carinae moderately inflated, median and accessory median with strong posterior spine. Knob on telson distinctly bilobed. Telson with 3 pairs of marginal teeth: submedians with movable spines, apices of intermediate teeth slender and that of laterals blunt. Submedian teeth of telson with strong carinae ventrally. Uropodal exopod with 12 movable spines on outer margin of proximal segment. Basal prolongation of uropod with rounded lobe on inner margin proximally.

**Measurements**: Male: Total length 15.5 mm; rostral plate length 2 mm; rostral plate width 1.5 mm; abdominal width 4.2 mm; carapace length 5.2 mm; telson length 3 mm; telson width 3 mm.

Female: Total length 14 mm; rostral plate length 1.5; rostral plate width 1 mm; abdominal width 3.5 mm; carapace length 5 mm; telson length 2.5 mm; telson width 2.5 mm.

**Remarks**: Manning and Reaka (1982) described *G. insularis* belonging to the *G. falcatus* complex based on material from Enewetak Atoll in the Pacific with which the present specimens from the Lakshadweep agree well. *G. insularis* agrees with *G. aloha*; *G. mutatus* and *G. siamensis* in having a bilobed knob on the telson and in the absence of a median carinule on the 6th abdominal somite but differs from them in having narrower carinae with relatively long posterior spines on the median and accessory median carinae of telson as well as much slender intermediate teeth.

Abdominal width/carapace length index for the female specimen is 700 and that of the male 808 and the mean for the two is 754 which falls within the range for the Enewetak material as provided in the original description. None of the colour markings given in the original description are present except for scattered dark brown chromatophores on the entire dorsal surface.

**Distribution**: This is the first report of the species since its discovery by Manning and Reaka (1982) from Enewetak and greatly extends the range from the mid-Pacific to the Arabian Sea in the Indian Ocean.

10. **Gonodactylus mutatus** Lanchester


**Material examined**: 1 ♂, TL 42 mm; 1 ♀, TL 44 mm; Minicoy, Lakshadweep; from coral in Lagoon; D.R.K. Shastry; 14.2.1986.

**Description**: Rostral plate as long as broad, median spine relatively short, anterior margin straight, anterolateral angles broadly rounded. Ocular scales small, apices rounded. Sixth abdominal somite with 6 variously shaped carinae, each ending in a posterior spine, a pair of black spots present anteriorly between submedian and intermediate carina. Telson slightly broader than long, dorsal carinae variously inflated, mid-dorsal carinae more tumid in adult males than in the females. Marginal teeth on telson broad, submedians with movable apices, a black spot present anterior to each submedian carina. Setae on outer margin of uropodal endopod directed dorsally. Outer spine of protopod with a single lobe on inner margin.

**Remarks**: Relatively small size and tumidity of the mid-dorsal carinae of telson are characteristic of *G. mutatus*.

**Distribution**: As per Manning (1978) the species is known definitely from
Vietnam, Thailand, Maldive Islands, Seychelles Islands, Zanzibar and Red sea. The present record from Lakshadweep is the first from the Indian waters.

**Family PSEUDOSQUILLIDAE**

11. *Pseudosquilla ciliata* (Fabricius)


**Material examined** : Nil (Record and description based on references listed above.)

**Description** : Cornea subcylindrical. Rostrum broader than long, lacking apical spine. Dactylus of raptorial claw slender, with 3 teeth. Sixth abdominal semite with sharp posterior spines. Telson with sharp median carina, 3 pairs of marginal teeth present, submedians with slender movable apices and submedian denticles absent.

**Remarks** : *Pseudosquilla ciliata* and *P. oculata* are the two closely resembling and widely distributed species in the Atlantic and Indo-Pacific region. Presence of a pair of large and dark circles on the carapace and apical spine on the rostrum characterise *P. oculata*.

**Distribution** : Atlantic and Indo-Pacific. It was previously reported from Minicoy by Lanchester (1903) and Shanbhogue (1969).

**Family SQUILLIDAE**

12. *Alima hyalina* Leach

1818. *Alima hyalina* Leach, in Tuckey: *Narrative of an expedition to explore the River Zaire* : 416.


**Material examined** : Nil (Record and description based on references listed above.)

**Description** : Rostrum triangular. Carapace with short anterolateral spines and a median carina. Lateral process of 5th thoracic somite bilobed, 6th and 7th undivided. Dactylus of raptorial claw with 6 teeth. Two rounded lobes present between spines of basal prolongation of uropod.

**Remarks** : A very few adult forms of *A. hyalina* have so far been recorded from the world oceans. A male specimen (33 mm) and a female (38 mm) from Minicoy by Shanbhogue (1971 b) are the only records of its occurrence from the Indian waters.

**Distribution** : Atlantic and the Indo-West pacific from the East coast of Africa to Hawaii.

**Family LYSIOSQUILLIDAE**

13. *Heterosquilla jonesi* (Shanbhogue)


**Material examined** : Nil (Record and description based on references listed above.)

**Description** : Cornea broad, bilobed. Rostrum squirish, broader than long, apical spine absent. Dactylus of raptorial claw with 4 teeth. Carapace smooth, carinae absent. Lateral margin of 5th thoracic somite bilobed. Ventral keel on 8th thoracic somite absent. Mid-dorsal portion of 6th abdominal somite separated from the lateral margin by
GHOSH: *Crustacea: Stomatopoda*

a distinct groove running from the anterior to posterior margin, posterolateral angles produced into long spines. Telson broad, medially smooth, marginal teeth 3 pairs; submedians slender and movable. Four intermediate and 1 lateral denticle present on telson. Inner spine of basal prolongation of uropod broad, curved and longer than outer.

**Remarks**: Based on the bilobed cornea and 4 intermediate denticles on telson the species is here transferred to *Heterosquilloides* Manning (1966) originally described as a subgenus of *Heterosquilla* Manning, 1963 and later raised to generic status (Manning 1980).

**Distribution**: Known only by a male, Holotype (TL 54.5 mm) from its type locality, Minicoy.

**SUMMARY**

Our knowledge of Stomatopoda of the Lakshadweep is limited to eight species reported from Minicoy of the Archipelago. Recent material from Agatti, Kavaratti and Minicoy revealed occurrence of five more species viz. *Gonodactylus arabica* n.sp., *G. insularis* Manning and Reaka, *G. minikoienensis* n.sp., *G. mutatus* Lanchester and *G. viridis* Serene. All the 13 species so far known from the Archipelago are described and keyed in the present paper.

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INTRODUCTION

The taxonomy of the Indian Orthoptera have recently been studied from the mainland by numerous workers like, Chopard (1969), Tandon and Shishodia (1969 and 1972) and Shishodia and Hazra (1985), but the island fauna of Lakshadweep have not been studied so far. The present paper deals with a small collections of grasshoppers from these islands belonging to 3 species under 3 genera. It is expected that there may still be more interesting species of Orthoptera for which detail survey is needed in near future, as the present collection represents only a small percentage of the total Orthopteran fauna.

**Order** O**RTHOPTERA**

**Suborder** C**AELIFERA**

**Superfamily** A**CRIDOIDEA**

**Family** A**CRIDIDAE**

**Subfamily** C**ATANTOPINAE**

1. *Catantops pinguis innotabilis* (Walker)

(Fig. 1,2,3,4)


*Diagnostic characters*: Medium size; general colouration light brown to deep brown; basal disc of wing colourless but the middle portion is composed of some deep brown markings; tegmina and wings extends beyond the middle portion of hind tibia; the lateral side of hind femur is provided with black bands which extends to the medial portion of the same. Cercus broadened at the base then slightly narrowed and slightly flattened at the top, the end portion bilobed; the upper one is large and pointed and lower one comparatively shorter and blunt; prosternal tubercle elongated and round in structure.

*Measurements* (mm): Length of the body 31; antenna 11; pronotum 9; elytra 28; hind femur 18; hind tibia 14.

*Remarks*: The specimens from Lakshadweep differ from mainland species in having deep black continuous band on the dorsal surface of the hind femur.

*Distribution*: *C. pinguis innotabilis* is widely distributed in India and is being recorded for the first time from Lakshadeep. It is also known from Sri Lanka and Burma.
Fig. 1. *Catantops pinguis innotabilis*; Hind femur, external side, Lakshadweep.

Fig. 2. *Catantops pinguis innotabilis*; Hind femur, internal side, Lakshadweep.

Fig. 3. *Catantops pinguis innotabilis*; Hind femur, external side, mainland.

Fig. 4. *Catantops pinguis innotabilis*; Hind femur, internal side, mainland.

Fig. 5. *Morphacris fasciata sulcata*; front portion of the head region.

Fig. 6. *Morphacris fasciata sulcata*; entire pronotum. Fig. 7. *Morphacris fasciata sulcata*; Hind femur, external side.
Subfamily ACRIDINAES

2. Morphacris fasciata sulcata (Thunberg, 1815)
   (Fig. 5, 6, 7)


Material examined : 1 Female in and around the agricultural farm, Agatti, 3.iv.84, coll. D. K. Mandal and party.

Diagnostic characters : Medium size, brown, eye round, fastigium narrow, tip of the fastigium bifurcated with median demarcated line. There are longitudinal striations arising from upper part which continued to the lower part of the pronotum. These striations also constituted some back granules, some are large and some are small. Antenna somewhat larger and more or less same length as of head and pronotum together. The side of the pronotum yellowish, legs yellowish brown, the upper and lower portion of the femur composed of some black bands, longer in size. Hind tibiae yellow. The spines are yellow and tips are black. Tegmina yellowish brown with black granules like structure which extends beyond the middle portion of tibia. Wings light yellow at the base bordered by blackish band.

Measurements (mm.) : Length of the body 24; antenna 13; pronotum 11; elytra 22; hind femur 13; hind tibia 12.

Distribution : India (West Bengal, Bihar, Madras, Orissa, Surat, Bombay); S. Africa.

3. Acrotylus humbertianus saussure
   (Fig. 8, 9, 10)


Materials examined : 1 Female Bangaram C 15 Kms. North of Agatti, 7.iv.84 D. K. Mandal and party.

Diagnostic Characters : Medium size, brown in colour, head small, vertex triangular, costal ridge sulcated and broad and becomes narrower at the vertex (fig. 8). Eye round covered about the half portion of the head. Two black stripes arising from the lower margin of the eye and ends upto the upper margin of the metazonal part of pronotum which ultimately ends with two white spots (fig. 9). Two white spots at the base of the prozona where the black stripes end (fig. 10). Antenna filiform, longer than head and pronotum together, 26-28 segmented. The lateral part of the pronotum possessing two black broad stripes which also end at the lateral part of the metazonal area. Metazona longer than prozona. Elytra and wings fully developed; wings hyaline yellow at the base. Hind femur broken, tibia broken, first and second pairs of legs are longer spiny. Spurs of first and second pairs of legs are longer than internal. Epiphallus with broad bridges anchorae, lophibilobate.

Measurements (mm.) : Length of the body 12; antenna (broken); pronotum 4; elytra 15; hind femur 9; hind tibia 8.

Remarks : The species occurs widely in the mainland.

Distribution : India (West Bengal, Madhya Pradesh, Tamil Nadu, Bombay); Sri Lanka and Afghanistan.
Fig. 8. *Acrotylus humbertianus*; Head region. Fig. 9. *Acrotylus humbertianus*; Head and pronotal band structures. Fig. 10. *Acrotylus humbertianus*; Entire fastigium, band and pronotal carinae.

**SUMMARY**

The present paper deals with 3 species of Orthoptera which constitute new records from these islands. The diagnostic characters and illustrations of interesting species have been provided.

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INTRODUCTION

The present work is the result of scientific investigation of the lesser known fauna of Lepidoptera from the Union Territory of Lakshadweep (U.T.L.), India. It is based on the author's legite of samples in fourteen species from the northern islands of the archipelago during March-April, 1984. The islands covered were Kavaratti, Agatti, Kalpitti, Bangaram, Kadmat and Amini.

The pioneering publication on Lepidoptera from U.T.L. dates back to Meyrick (1903), who gave an account of forty-one species, including four butterflies, from the southern-most Minicoy Island. He also worked out species from the neighbouring Maldives showing greater affinities with those from Minicoy than from the northern islands of Lakshadweep presently surveyed. All these elements were concurrently collected by an expedition made by J. S. Gardiner in 1899-1900. Within this intervening gap of more than eight decades, no systematic exploration of entomo-fauna including Lepidoptera was ever undertaken at U.T.L. So, the territory remained neglected since then in respect of continuing further studies on the natural fauna of the archipelago.

Hence, an attempt is made to furnish a listed taxonomical account of the scale-winged insects from U.T.L. It is accompanied by key characters, distribution and a table of locality data of the fauna explored by the author. An appendix to the major angiospermic flora with the citation of some as known food for the species particularly from the northern islands, is also incorporated.

LIST OF TAXA FROM LAKSHADWEEP

[*, Earlier known from Minicoy; , species amongst the material examined common with those from Minicoy.]

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16. scitaria (Walk.)
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17. varians (Walk.)
Family L.  ARCTIADAE
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Genus (17)  Celama Walk.
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25. *tibialis* (Fabr.)
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26. *signifera* (Walk.)
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27. *coronata* (Fabr.)
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28. *mygdon* (Cr.)
    *Subfamily (E) PHYTOMETRINAE
    Genus (27) *Phytometra* Haw.

29. *permissa* (Walk.)
    *Subfamily (F) NOCTUINAE
Genus (28) Polydesma Bois.
30. metaspila (Walk.)
Genus (29) Simplicia Guen.
31. robustalis (Guen.)
Genus (30) Hydrillodes Guen.
32. lentalis Guen.
Genus (31) Bomolocha Hübner.
33. indicatalis (Walk.)

*Family N. GEOMETRIDAE
Subfamily (A) GEOMETRINAE
Genus (32) Boarmia Treit.
34. boarmiaria (Guen.)
Subfamily (B) ACIDALIINAE
Genus (33) Acidalia Treit.
35. addictaria Walk.
36. aspilataria Walk.

*Family O. TORTRICIDAE
Genus (34) Adoxophyes Meyr.
37. euryomis Meyr.

*Family P. EUCOSMIDAE
Genus (35) Eucosma Hübner.
38. leucaspis Meyr.
Family Q. PYRALIDAE
*Subfamily (A) PHYCITINAE
Genus (36) Epicrocis Zell.
39. lateritialis (Walk.)
*Subfamily (B) ENDOTRICHINAE
Genus (37) Endotricha Zell.
40. mesenterialis (Walk.)
*Subfamily (C) NYMPHULINAE
Genus (38) Bradina Lec.
41. admixtalis (Walk.)
Subfamily (D) PYRAUSTINAE
*Genus (39) Hymenia Hübn.

42. recurvalis (Fabr.)
*Genus (40) Eurrhyparodes Sn.

43. tricoloralis (Zell.)
*Genus (41) Ercta Walk.

44. ornatalis (Dup.)
*Genus (42) Conogethes Meyr.

45. suralis (Walk.)
*Genus (43) Lamprosema Hübn.

46. niphealis (Walk.)
*Genus (44) notarcha Meyr.

47. penthodes Meyr.
*Genus (45) Epichronistis Meyr.

48. acrospila Meyr.
Genus (46) Diaphania Hübn.

49. indica (Saund.)
*Genus (47) Glyphodes Guen.

50. suralis Led.
*Genus (48) Leucinodes Guen.

51. orbonalis Guen.
*Genus (49) Ischnurges Led.

52. gratiosalis (Walk.)

Key to identification of genera, species and subspecies of LEPIDOPTERA from Lakshadweep

[Based on the material examined by the author.]

1. Antennae knobbed. Frenulum absent .......................................................... 2

Antennae not knobbed. Frenulum present...................................................... 9
2. Fore legs perfect in both sexes ................................................................. 3
   Fore legs imperfect in one or both sexes .................................................. 4

3. Hind wing 1A absent; tail spatulate.
   Frons and thorax with white lateral lines............................................. *Papilio*
   Fore wing with prominent white terminal lunules; female hind wing white
   postdiscal spots ................................................................. *polytes romulus*
   Hind wing 1A present; tail absent; wing-shape rounded.
   Fore Wing R2 from cell ............................................................... *Eurema*
   Male sex-brand prominent. Wings yellow; fore wing black terminal border
   extending basad ................................................................. *hecabe contubernais*

4. Wings with cell closed ............................................................................. 5
   Wings with cell open; fore wing R2 free; hind wing without prediscoidal cell.
   Eyes hairy ........................................................................................ *Vanessa*
   Hind wing distal half orange-yellow .................................................... *cardui*

5. Fore wing 2A forked with 1A. Legs imperfect in male............................... 6
   Fore wing 2A free ................................................................................ 8

6. Tarsal claws without paronychia and pulvilli. Male brand on hind wing only ...
   ........................................................................................................... *Danaus*
   Tarsal claws with paronychia and pulvilli. Male brand may be on fore wing, too
   ........................................................................................................... *Euploeoa*
   Male fore wing ventrally with whole area of 2A and posterior part of 1A nacreous
   and dorsally with the brand not extending to below the origin of Culb ....... *core core*

7. Male hind wing with a single scent-patch; veins black; cell white. Fore wing
   streaks beyond end-cell not wider than half their length. Ground-colour black, with
   bluish-white semi-hyaline spots ...................................................... *limniace leopardus*
   Male hind wing with two scent-patches; with two spots in the middle of area M1
   in both sexes ................................................................. *aglea aglea*

8. Fore wing Sc highly inflated at origin; wings normally scaled. Legs imperfect in
   both sexes. Palpi with hairs appressed ............................................. *Melanitis*
Fore wing without subapical orange-yellow markings; others bordering the subapical black spot not reaching costa.......................... leda ismene

Fore wing Sc never inflated; wings thinly scaled. Legs imperfect in male. Hind wing cell long.......................... Acraea

Male wings deep tawny, with black discal bar, cell- and postdiscal spots; hind wing with small white subterminal spots and narrow terminal black border
.......................................................................................... violae

9. Hind wing Sc + R1 anastomased with RS beyond end-cell.......................... 12
Hind wing Sc + R1 remote from RS beyond end-cell.......................... 10

10. Hind wing Sc + R1 shortly anastomosed with RS near base. Proboscis developed
.......................................................................................... 11
Hind wing Sc + R1 rising out of RS. Proboscis reduced. Fore wing long and narrow. Male antennae ciliated.......................... Utetheisa

Fore wing creamy white, strewn with black and red dots; hind wing purely white, with irregular black terminal band.......................... pulchella

11. Hind wing M2 well developed and close to M3 at base. Fore tibiae not fringed with hairs, mid-tibiae spined. Fronts tufted.......................... Euclidisema

Fore wing antemedial band obliquely arising from below costa and postdiscal black patch evenly curved outwardly.......................... mygdon
Hind wing M2 obsolescent. Fore tibiae broadly fringed with hairs...... Spodoptera

Male antennae ciliated. Hind wing semihyaline white.......................... mauritia

12. Fore wing R2 from cell' .......................................................... 13
Fore wing R2 stalked with R3-4. Palpi erect, with 3rd segment short and blunt. Hindwing Sc + R1 and RS anastomosed to 2/3rds of its length. Antennae annulate and shorter than fore wing.......................... Bradina

Male fore wing without fovea at end-cell. Body pale ochreous brown. Wings with a postdiscal curved brown line.......................... admixtalis

13. 3rd segment of palpi erect, long and acuminate.......................... Hymenia

Fore wing discal band white and edged black; hind wing discal band of uniform width.................................................. recurvalis
3rd segment of palpi porrect. Anal tuft plumose.......................... Diaphania
MANDAL : Insecta : Lepidoptera

Fore wing costa and dorsum broadly black, leaving a triangular pearly-white hyaline patch. Body black-brown. Abdomen with a terminal brush of spatulate scales ........................................................................................................... indica

SYSTEMATIC ACCOUNT

[Cf. Table I for the code/s of Material examined. Names of taxa in (=) used for the Minicoy fauna by Meyrick, 1903.]

Order LEPIDOPTERA
Suborder I. RHOPALOCERA
Family A. PAPILIONIDAE
Subfamily PAPILIONINAE
Tribe Papilionini
Genus (1). Papilio Linnaeus

1. Papilio polytes romulus Cramer
   (Plate I)

1775. Papilio romulus Cramer, Pap. Exot., 1 : 67, pl. 43, fig. A.

Material examined: LKDA; LKVI.


Remarks: This is a remarkably polyphenic subspecies of the polytypic species in polytes-species group placed earlier by Mandal (1985) sensu Hancock (1983) under the subgenus Menelaides Hüb. of the genus Princeps Hüb. Here only a couple of female forms are recognised, viz., female f. romulus Cr. (from the Kadmat Is.), with fore wing crossed obliquely from mid-cell to tornus by a broad white band and hind wing markings all red, and female f. stichius (Hüb.) (from the Kavaratti Is.) with fore wing dark internervular streaks extending into the cell and hind wing discal white elongate spots and subterminal series of small red lunules; these are respectively mimetic of Atrophaneura hector (Linn.) and A. aristolochiae (Fabr.). Talbot (1939) cited bionomical notes on this butterfly.

Subfamily COLIADINAE
Genus (2) Eurema Hübner

2. Eurema hecabe contubernalis (Moore)
   (Plate I)

Material examined: LKVD.

Distribution: India (Western Garhwal; Sikkim; West Bengal; Lakshadweep). Burma. Malay Peninsula.

Remarks: A member of the polytypic species, the butterfly belongs to the hecabe-species group and exhibits sexual dimorphism. It fits well in the wet-season form merguiana (Moore), being recognised by the wings ventrally with all the markings obsolescent in male and hind wing terminal black band with its inner edge diffused in female. It was often observed to ascend high up in the air and alight on flowers or damp patches in the open hot plains like those in the areas surveyed. Mandal (1984) recorded the subspecies from the Western Garhwal Himalayas.

Family C. DANAIDAE
Subfamily DANAINAE
Genus (3). Danaus Kluk

3. Danaus limniace leopardus (Butler) (Plate - I)


Material examined: LAGG; LAVG.


Remarks: Placed in the limniace-species group, the butterfly shows variations mainly in the striped pattern of hind wing. These stripes in the insular member are less prominent than in the mainland counterpart—a fact coinciding with the views of Talbot (1947). Only one specimen from Agatti is appreciably smaller, with expanse 74 mm, as compared to the known scale of measurement starting from 90 mm. A shade-lover and nocturnal in habit, the species keeps to the hedges. It is known to occur in North Andaman as a straggler, besides its regular habitats elsewhere as cited above.

4. Danaus aglea aglea (Stoll) (Plate - I)


Material examined: LAGG.

Distribution: India (Eastern and southern Peninsulas; Lakshadweep). Sri Lanka.

Remarks: A member of the polytypic species in the aglea-species group, the butterfly exhibits weak and sustained flight. It is apparently fond of yellow flowers, as observed in the field. Also it is attracted by artificial light like the preceding and a few of the following species, as indicated in the material data.
Genus (4). **Euploea** Fabricius

5. **Euploea core core** (Cramer)
   (Plate - II)


**Material examined**: LAGG.

**Distribution**: India (Throughout the mainland; Lakshadweep).

**Remarks**: A member of the highly polytypic species of the *core*-group, the butterfly sails along lazily in a characteristic danaine style. It is known as a good model of *Chilasa* sp. [Papilionidae] and also of female of *Hypolimnas bolina* (Linn.) [Nymphalidae] in the mainland and elsewhere.

Family D. **SATYRIDAE**

*Genus (5). **Mycalesis** Hübner*

6. **Mycalesis mineus polydecta** (Cramer)
   [= *polydecta*]


**Distribution**: India [Western, eastern and southern Peninsulas; U.T.L. (Minicoy)]. Sri Lanka. Maldives.

**Remarks**: Talbot (1947) considered the butterfly in the *mineus*-species group.

Genus (6). **Melanitis** Fabricius

7. **Melanitis leda ismene** (Cramer)
   (Plate - II)


**Material examined**: LAGG; LKDB; LKVI.


**Remarks**: The butterfly is shade-loving and elicits a rather weak jerky flight. It remains on the wing in the evening or early morning and, for rest of the day, settles on the ground with wings closed in a laterally tilted manner. The specimens examined are aptly distributed in their relevant dry- and wet-season forms. The d.s.f. *ismene* (Cr.) is recognised by the falcate forewing with a sharply defined ochraceous bar bordering a black and white-centred spot on the inner side, and the w.s.f. *determinata* Butler, by the wings ventrally with prominent ocelli. The first form was observed predominantly together with the scarcely occurring second form in the islands visited. Incidentally, the species "*leda*" was described by Linnacus (1758) from "Asia" as type of the genus.
Butler (1867) ascertained that the species originated in Amboina from where Linneues (loc.cit.) received many specimens, as stated by Fruhstorfer (1927). Bingham (1905), referred to "Drury" as the author of the species, which is incorrect.

Family E. ACRAEIDAE
Genus(7). Acraea Fabricius

8. Acraea violae (Fabricius)
(Plate - II)

Material examined : LAVG.

Distribution : India (Western Himalayas; throughout the Peninsulas; Lakshadweep). Pakistan. Sri Lanka.

Remarks : Belonging to the smallest of all the Indian lepidopteran families, the butterfly is known to be sexually dimorphic, but without secondary sexual character in male. It is very tough and tenaceous in habit, secreting acrid juices when disturbed. It has neither mimic-model relation nor geographical form. It is found in open land on the lazily fluttering wing near the ground. The species is endemic in the Indian subregion. The Acraeids apparently reduce the art of protection to a higher degree of perfection than even the Danaids, which mutually share an identical pattern in broad respect.

Family F. NYMPHALIDAE
Genus (8). Vanessa Fabricius

9. Vanessa cardui (Linnaeus)
(Plate - III)

Material examined : LAGA.

Distribution : Supposedly universal, except South America.

Remarks : This polyphagous and the most widely distributed butterfly amidst the Rhopaloceran series in the world is, however, not represented by any subspecies from India and probably also elsewhere, and thus presents a good example of undergoing conservative mode of evolution. Wynter-Blyth (1957) hinted on its wide distribution being mainly due to its habit of long-distance migration and also to its very wide choice of food-plants. It is a strong, swift, dashing and erratic flier, landing often in open places like fields, wastelands, gardens, roads, etc. In India, it is known as a straggler at the Andaman Island, apart from its common occurrence on the hills, plains and other ecosystems down to the sea-level. With the present discovery of the element as an apparently sporadic dweller at least in the northern part of Lakshadweep, the knowledge of its further jurisdiction of distribution in the Arabian Sea gains momentum.
MANDAL: Insecta: Lepidoptera

Family G. LYCAENIDAE
Subfamily LYCAENINAE
Genus (9). Spalgis Moore

*10. Spalgis epeus epeus (Westwood)
[= Spalcis epius]
1852. Lucia epeus Westwood, in Doubleday et al, Gen.diur.Lep., 2 : 502, pl. 76, fig.5.


Remarks: Cantlie (1962) considered the species under the Castalius-genera group. As already known, with the only exception of the very rare Moth-Butterfly, Liphyra brassolis Westwood, from the eastern Himalayas, this is another Indian member whose larva is definitely carnivorous, feeding on the kitchen plant-infesting Coccids, i.e., the Mealy Bugs. Meyrick (1903) misspelt the species as "Spalcis epius". The species occurs only in the Indian subregion.

*Genus (10) Zizula Chapman

11. Zizula hylax (Fabricius)
[= Zizera gaika Trim.]


Remarks: The species is known to be intermittently attended by ants in the larval stage for protection.

*Family H. HESPERIIDAE
[= Hesperiidae]
Subfamily HESPERIIANE
Genus (11). Borbo Evans

12. Borbo cinnara (Wallace)
[= Baoris colaca M.]

Remarks: Evans (1949) placed the element under the Gegenes-genera group.

Suborder II. HETEROCERA
*Family I. SPHINGIDAE
Group Semanophorae
Subfamily (A). SESIIAE
Tribe Sesiini
Genus (12). Cepbonodes Hiibner

13. Cepbonodes hylas hylas (Linn.)


Remarks: The subspecies, after Bell & Scott (1937), occurs in both hills and plains in all types of country, being always common and in some seasons so numerous as to become a serious pest by defoliating Rubiaceous trees and shrubs. It is polyphagus in habit.

Subfamily (B). PHILAMPELINAE
Tribe Nephelini
Genus (13). Macroglossum Scopoli

[= Macroglossa]

14. Macroglossum sitiene (Walker)


Remarks: Bell & Scott (1937) mentioned Morinda umbellata (N.O. Rubiaceae) as the food-plant of the species from the Indian mainland.

Subfamily (C). CHOEROCAMPINAE
Genus (14). Hippotion Hiibner

15. Hippotion rafflesi (Butler)

[= Deilephila theylia L.]

Remarks: The moth is known to be readily attracted to flowers and also by artificial light preferably in the wet forests. It is also known to feed on *Impatiens* spp. (*N.O.* Geraniaceae). Meyrick (1903) misquoted the author of the species, "*D. thelyia*", now synonym of *rafflesi*, as "Linn." in place of the correct name "Cramer"

*Family J. THYRIDIDAE
Genus (15). Striglina Guenée

16. Striglina scitaria (Walker)


Remarks: Amongst over half a dozen of Indian species in the genus, this is the only one that is known to extend in the eastern Palaearctic. It is rather difficult to ascertain the morph to which the material examined by Meyrick (1903) really belong. In fact, there is, *interalia*, a couple of Indian forms, viz., *strigosa* (Moore) and the nominate one, under this widely distributed species.

*Family K. LYMANTRIDAE
[= Ocneriadae]
Subfamily LYMANTRINAE
Group Inareolatae
Genus (16). Euproctis Hiibner

17. Euproctis varians (Walker)


Family L. ARCTIADAE
*Subfamily(A). NOLINAE
Genus (17). Celama Walker

18. Celama squalida (Staudinger)


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Subfamily (B) Arctiinae

Genus (18) Utetheisa Hübner

19. Utetheisa pulchella (Linnaeus) (Plate - III)


Material examined: LAGG; LBAN; LKDA.


Remarks: This tropico-subtemperate day-flying moth has been observed in singletons at different islands of U.T.L. It appears to be a great shore-lover and is flushed in grasses. When disturbed, drops of acrid juices exude from the thorax. The specimens captured are rather small in size and fit well in f. tenuella Seitz. Seitz (1913) described the form from Eastern Asia and did not mention it as subspecies inspite of its definitive geographical distribution, probably due to the extreme local variation of characters other than size. He (loc.cit.) treated this moth under the subfamily Micrarctiinae, while Rothschild (1933), sensu Hampson (1901), transferred it to Arctianae which is followed here. Observation on swarm-formation of this moth was made by Seitz (loc.cit.) in certain areas of Europe. Cotes & Swinhoe (1887-89) erroneously cited the year of original publication of the species as “1767” Seitz reported the species as highly aberrant.

Family M. Noctuidae

[ = Caradrinidae; Plusiidae]

*Subfamily(A) Hadeninae

Genus (19) Polia Ochsenheimer

[ = Melanchra]

20. Polia consanguis (Guenée)


Genus (20) Polytela Guenée

21. Polytela gloriosae (Fabricius)


Distribution: India [Manipur; Maharashtra; Punhab; Madhya Pradesh; Orissa;
Karnataka; Tamil Nadu; Kerala; U.T.L. (Minicoy)]. Sri Lanka.

Remarks: The species, which is confined to the Indian subregion, is known to feed on Gloriosa superba and Amaryllus sp. in the Indian mainland and also Sri Lanka.

Subfamily (B). ACRONYCTINAE

Genus (21). Spodoptera Guenée

22. Spodoptera mauritia (Boisdouval)

(Plate - III)

1833. Hadena mauritia Boisdouval, Fauna Ent. Madag. Lep., p.92, pl.13, fig.9.

Material examined: LAGN.


Remarks: Mainly a tropical species, this moth, of which the larvae are known to be injurious to rice in northern India, could not, however, be determined up to its subspecific level because of the rubbed-off condition of the material at hand. The specimen is comparatively small in size and seems to be rare in the area surveyed. Incidentally, Warren (1914) treated the species in the subfamily Amphipyridae and not Acronyctinae, in the latter of which the author retains it sensu Hampson (1909).

*Genus (22). Athetis Hübner

[ = Caradrina ]

23. Athetis obtusa (Hampson)


*Genus (23). Chasmina Walker

[ = Leocyma ]

24. Chasmina sericea (Hampson)


Remarks: The species is not known from the Indian mainland.
25. Chasmina tibialis (Fabricius)  

\[= cygnus \text{ Walk.}\]


*Remarks*: Meyrick (1903) commented on the material for his study as “in too poor condition to identify certainly” the species.

*Subfamily (C). ERASTRIANAE*

Genus (24). Lithacodia Hübner  

\[= \text{Hyelopsis}\]

26. Lithacodia signifera (Walker)


*Subfamily (D). CATOCALINAE*

*Genus (25). Anua Walker  

\[= \text{Ophiusa}\]

27. Anua coronata (Fabricius)


*Genus (26). Euclidisema Hampson  

\[= \text{Grammodes}\]

28. Euclidisema mygdon (Cramer)  

(Plate - III)


*Material examined*: LKVV.

*Distribution*: India [Western and eastern Himalayas; northern, eastern and southern Peninsulas; Andaman and Nicobar Islands; U.T.L. (both the northern and southern

Remarks: This widely distributed species is tropical oriental in origin, though its range extends to Palaearctic Asia, too. Its expanse is quite smaller than the known scale of measurement.

*Subfamily (E). PHYTOMETRINAE
Genus (27). Phytometra Haworth

[ = Plusia ]

29. Phytometra permissa (Walker)


Remarks: The species is restricted within the Indian subregion. Its locality, being mentioned as “BOMBAY” by Hampson (1913), seems to be doubtful, since under this state he cited only “Kanara” that is now included in Karnataka proper of South India.

Subfamily (F). NOCTUINAE

*Genus (28). Polydesma Boisduval

[ = Ophiusa ]

30. Polydesma metaspila (Walker)


Remarks: Hampson (1894) considered this moth under the subfamily “Quadrifini” Later, Warren (1914) treated the genus under Noctuinae, as presently adopted.

*Genus (29). Simplicia Guenée

31. Simplicia robustalis (Guenée)
1895. Simplicia robustalis : Hampson, Fauna Brit. India. Moths, 3 : 36, fig.16.


Remarks: Earlier Hampson (1895) considered this and the following three genera under the subfamily “Deltoidinae” But all these are placed here under Noctuinae sensu Warren (1914).
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*Genus (30). **Hydriilloides** Guenée

32. **Hydriilloides lentalis** Guenée

1854. *Hydriilloides lentalis* Guenée, *Delt. et Pyral.*, p.66, pl. 5, fig. 3.


*Remarks*: Hampson (1895) mentioned three morphs, viz., *uliginosalis* Guenée, *latifascialis* (Walker) and the nominate one, under the species; but it is difficult to guess to which one of these morphs, the material studied by Meyrick (1903) should actually belong.

*Genus (31). **Bomolocha** Hübner

[ = *Hypena* ]

33. **Bomolocha indicatalis** (Walker)


Family N. **GEOMETRIDAE**

[ = Selidosemidae; Sterrhidae ]

Subfamily (A). **GEOMETRINAE**

*Genus (32) **Boarmia** Treitschke

[ = *Ascotis* ]

34. **Boarmia boarmiaria** (Guenée)


*Remarks*: While Hampson (1895) placed the species under "Boarmiinae", Prout (1912) treated it under Geometrinae. The treatment is followed here after Prout (*loc. cit.*) for this species.

*Subfamily (B). **ACIDALINAE**

Genus (33). **Acidalia** Treitschke

[ = *Leptomeris* ]

35. **Acidalia addictaria** Walker


*Distribution*: India [Western and eastern Himalayas; western, northern and southern Peninsulas; U.T.L. (Minicoy)]. Burma. Sri Lanka.
**Remarks**: Hampson (1895) considered this and the following species in the genus "Craspedia" under Acidalinae. But Prout (1912) relegated "Leptomeris", "Craspedia" and a few more genera to the synonymous status of Acidalia Treits. The moth is restricted within the limits of the Indian subregion.

36. **Acidalia aspilataria** Walker


**Remarks**: Like the preceding species, this one is also confined in the Indian subregion, but it is yet to be recorded from the mainland of India proper.

*Family O. TURRICIDAE

Genus (34). *Adoxophyes* Meyrick

37. **Adoxophyes euryomis** Meyrick

**Remarks**: The author could not find out the original literature for this species and also the one to follow. Meyrick (1903) recorded this species both from the Minicoy Island, U.T.L., India, and Hulule of the Maldives. Other specific ranges of distribution of the species, if any, are, however, unknown to the author.

*Family P. EUCOSMIDAE

[ = Epiblemidae ]

Genus (35). *Eucosma* Hübner

38. **Eucosma leucaspis** Meyrick

**Remarks**: The type-locality of this species, which was recorded from the same locality of Minicoy, like the preceding one, by Meyrick (1903), is also unknown to the author. Meyrick (loc.cit.) himself commented on the species as "not actually known to me as occurring in India or Ceylon". The author reserves his further comments on this statement of Meyrick who, however, originally described the species and subsequently recorded it from Minicoy.

*Family Q. PYRALIDAE

[ = Phycitidae; Pyralididae; Pyraustidae ]

*Subfamily (A). PHYCTITINAE

Genus (36). *Epicrocis* Zeller

[ = Canthelea ]

39. **Epicrocis lateritialis** (Walker)


**Distribution**: India [plains of mainland; Andaman Island; U.T.L. (Minicoy)]. Burma. Sri Lanka.
Remarks: The species is confined to the Indian subregion of the Oriental region.

*Subfamily (B). ENDOTRICHINAE
Genus (37). Endotricha Zeller

40. Endotricha mesenterialis (Walker)


*Subfamily (C). NYMPHULINAE
Genus (38). Bradina Lederer

[ = Pleonectusa ]

41. Bradina admixtalis (Walker)
(Plate - III)

*Material examined*: LKVV.


*Remarks*: The moth, with its very slender built, long legs and narrow wings, fits well in the species which is apparently very scarce in the territory surveyed by the author.

Subfamily (D). PYRAUSTINAE

*Genus (39). Hymenia Hübner

42. Hymenia recurvalis (Fabricius)
(Plate - III)

*Material*: LKVV.

*Distribution*: India [Western Himalayas; eastern and southern Peninsulas; Andaman and Nicobar Islands, U.T.L. (both the northern and southern islands including Minicoy)]. Elsewhere of the Oriental region, including the Maldives. Also, Palaeartic Asia from Syria to Japan, Ethipio-Malgassie, Australo-Papuan, Hawaiian, Nearctic and Neotropical regions.

*Remarks*: This widely distributed species was recorded earlier from the Great Nicobar Island in the Indian Ocean by Mandal & Bhattacharya (1980). It is known as a leaf-roller cum defoliator of *Amaranthus viridis*, *Trianthema monogyna*, *Glycine max*.
MANDAL : Insecta : Lepidoptera

...and Beta vulgaris. Hampson (1896, 1898) considered the species as "Zinckenia fascialis Cr.". But here the nomenclature is adopted sensu Klima (1939).

*Genus (40). Eurrhyparodes Snellen

[ = Molybdantha ]

43. Eurrhyparodes tricoloralis (Zeller)


Remarks : The species, which was earlier treated under the subgenus Molybdantha by Hampson (1896), was recorded from the South Andaman Island by Mandal and Bhattacharya (1980).

*Genus (41). Ercta Walker

[ = Hydriris ]

44. Ercta ornatalis (Duponchel)

1831. Asopia ornatalis Duponchel, Lep. Fr. 8 : 207, pl. 223, fig. 8.

Distribution : Rather sub-cosmopolitan except North Europe, Malagassic, Papuan, Hawaiian and North Nearctic.

Remarks : The species, however, could not also be seen at the northern islands of U.T.L. surveyed.

*Genus (42). Conogethes Meyrick

45. Conogethes suralis (Walker)

Remarks : Here also, this species and the next but one, i.e., Notarcha penthodes Meyrick, could not be found out in the literature hunted. Meyrick (1903) recorded it from the Minicoy island, U.T.L. In all probability, the genus has been changed to Dichocrocis Lederer, since Hampson (1896, 1893) sunk Conogethes Meyrick in the synonymy list of Dichocrocis. Other distributional data including the type-locality of the species are unknown to the author, though Meyrick (loc. cit.) referred to it, interalia, as occurring in "India or Ceylon" The name of the species also seems to be doubtful inasmuch as it is pre-occupied under Glyphodes (vide infra).

*Genus (43) Lamprosema Hübner

[ = Omiodes ]

46. Lamprosema niphealis (Walker)

State Fauna Series 2 : Fauna of Lakshadweep

Distribution: India [Eastern Himalayas; western and eastern Peninsulas; Nicobars; U.T.L. (Minicoy)]. Maldives. West Africa.

Remarks: Earlier Hampson (1896, 1898) considered the species in the genus Nacoleia Wlk.

*Genus (44). Notarcha Meyrick

47. Notarcha penthodes Meyrick

Remarks: Like Conogethes suralis, this species was also recorded from the Minicoy Island, U.T.L. by Meyrick (1903). Its type-locality, too, is unknown to the author. There is every likelihood of the genus Notarcha being changed to Sylepta Hübner, since Meyrick (loc.cit.) clearly pointed out *N. penthodes* as a representative, not known from “India or Ceylon” and replacing in “Minikoi” the common and widely distributed *N. multilinealis*, now *Sylepta derogata* (Farb.) being popularly known as the cotton Leaf-roller.

*Genus (45). Epichronistis Meyrick

48. Epichronistis acrospila Meyrick


Remarks: The species is typically insular in origin. It has much wide-apart ranges of distribution in the globe. It is, however, unknown from Sri Lanka.

Genus (46). Diaphania Hübner

49. Diaphania indica (Saunders)

(Plate - III)


Material examined: LKDA.


Remarks: This species, which was earlier recorded from the Great Nicobar Island by Mandal & Bhattacharya (1980), is known to feed on the cucurbitaceous and *Corchorous* spp. in the Indian mainland.

*Genus (47). Glyphodes Gueneé

[ = Margaronia ]

50. Glyphodes suralis Lederer


Remarks: This species sets another good example of having typically insular habitats in the globe. It was recorded from the Great Nicobar Island by Mandal & Bhattacharya (1980).

*Genus (48). Leucinodes Guenée

51. Leucinodes orbonalis Guenée

1854. Leucinodes orbonalis Guenée, Delt. et Pyral., p.223,


Remarks: The species is known to feed on the fruits of Solanum melongena in the Indian mainland.

*Genus (49). Ischnurges Lederer

52. Ischnurges gratiosalis (Walker)


Remarks: The species was also recorded earlier from the Great Nicobar Island by Mandal & Bhattacharya (1980).

DISCUSSION

It was J.S. Gardiner who for the first time dealt exhaustively with the physiography, soil and climate mainly of "Minikoi" at the extreme south of the "Laccadives" during the end of the last century. The relevant information on different groups of fauna including Lepidoptera by the concerned specialists was edited by him (Gardiner, 1903). It is imperative to comprehend the faunistics of a given area, found to be frequented by every species, not only on the basis of their geographical but also topographical distribution. The reason for the neglect of taking into account of such distributional patterns, chiefly the topographical one, at the northern islands during the intervening period may be due to the fragmentary knowledge of fauna like Lepidoptera and also due to the ignorance of their food-plants. As compared to the huge bulk of Lepidoptera, the number of species listed by the author is quite impoverished obviously due to the limited scope and time. It is, however, expected that the harvest of data-based surveys in years to come may prove useful in enriching further knowledge of the group concerned.

The order Lepidoptera is a very vast group of well-adopted scale-winged insects round the world, wherever there exists vegetation, except in the Arctic and Antarctica. Obviously, the infrastructure of the overall fauna from U.T.L. does not exhibit specialisation to an appreciable degree as compared in a broader sense to that in the tropical Oriental region. Nevertheless, the climatological features have an impact on the habits and habitats of the fauna, since, the archipelago serves as a good corridor, particularly through Minicoy, establishing biogeographical links not only with the southern peninsular areas and elsewhere of the Oriental region, but also with the Afro-Asian belts of the globe.
The Papilios have the feeding habit while on sustained flight over their food-plants; the other members examined do so while at repose on them. The day-flying species like Utetheisa pulchella could be seen on the wing at any time of the day and late in the evening, while the nocturnal members of Noctuidae and Pyralidae apart from certain Satyrid species were hardly found except when visiting flowers and cereals or when attracted to artificial light. The insects like Melanitis leda have to rely chiefly on their cryptic pattern for defending themselves against the predators. Other means of protective device through mimicry is also adopted by the Papilionid species as already cited in places under the systematic account. The food-plants cover a very large range comprising variable Natural Orders (N.O.s) from grasses to trees for quite a few species under study. While Vanessa cardui is extremely polyphagous, others like the Satyrids confine themselves to a single N.O. or even to a single species of plant, showing host-specificity. The status as to the abundance or rarity of species, as already known from a given area or parts thereof in the Indian mainland, may be quite variable. Interestingly enough, the species, like Papilio demoleus, Danaus chrysippus, which are so common in the plains of the mainland, were apparently observed to occur in a very low frequency like other singleton majority at U.T.L. It is, however, not possible at the moment to assess with accuracy the status of the fauna species by species within a short period of sejour in the archipelago. But it may so happen that usually uncommon species appear in a greater number in certain seasons or become locally common, depending on the theory of voltinism. Seasonal cum sexual variations and polyphenism are often attributed to the attacks of enemies that may act as powerful check on the periodical increase of susceptible species. No report was available from U.T.L. on the prevalence of the macrolepidopteran species like Cephonodes hylas defoliating the Rubiaceous plantations and a couple of Papilionids, viz. Papilio polytes and P. demoleus infesting the Rutaceous species, as known in certain parts of the Indian mainland. Of the Microlepidopteran pests, two were known to be major, viz., Anarsia sagittaria Meyr. (family Gelechiidae) on pomegranates and Nephantis serinopa Meyr. (family Xylorictidae) on poilusy leaf. The latter, noticed in 1978 at the uninhabited Suheli Par, was biologically controlled by releasing the Braconid parasites and also the Dipteran predators introduced from the C.P.C.R.I. Reg. Stn. at Kayamkulam near Quilon of Kerala. At least one specimen of Danaus limniace leopardus from Agatti has an appreciably reduced wing expanse possibly due to its inadequate nutrition or other aberration. Female of quite a many species were apparently rare in the territory, bearing an approximate ratio with male as 1:1.5, which may be just speculative on the basis of a poor number of specimens collected from different localities. From the data of Systematic account, it is evident that Minicoy is richer in both genera and species than the northern islands of U.T.L. The distribution of the fauna is dependent to some extent on the range of food-plants. The range of fauna is often far more restricted than that of its food-plants. This may be accounted for by the presence of a physical barrier, like sea, or by a change of climate within the range of food-plant. Sometimes, a tendency of the female to become sterile outside their usual habitat may also operate in such cases. Besides, certain members like Danaus limniace leopardus and Vanessa cardui are known to occur as stragglers in a given area, say the Andaman Island. Owing to their swift and powerful flight and also migratory habit, these species have a wide range. These habits also cause the stragglers to appear beyond their normal range, but their permanent establishment in such cases is often checked by the otherwise would-be sterile females.
Amongst the overall fauna surveyed till date from both the northern and southern islands of U.T.L., the macro-lepidopterans are predominated by the Noctuid, and the micro-lepidopterans, by the Pyralid moths. Meyrick (1903), however, predicted on the occurrence of other microlepidopterans like Tortricidae, Grapholithidae and Conchylidae (now, Eucosmidae) — all under Tortricina — in the archipelago, but these could not be studied at the moment. Likewise, the number of butterflies could not be satisfactorily augmented from these islands, possibly because of the extreme climate prevailing therein during the period of survey. The intra-insular distribution of the Lepidopteran species, including those observed on profile reconnaissance, is provided in Table I. Table II, on the other hand, helps cast a cursory glance on the isospecific line of zoogeographical distribution of the fauna as enlisted from U.T.L.

Noteworthily, the distributional system is basically adopted after Rothschild and Jordan (1903). Here, India is broadly divided into three ecosystems: (1) Extra-peninsular or Himalayan; (2) Peninsular; (3) Insular. The western Himalayas (“N.W.India” of Roths. & Jord.) comprise the ranges from the west of Nepal and also the Siwalik Mountains; the eastern Himalayas (“North India” of Roths. & Jord.) represent the ranges from the east of Nepal up to Arunachal Pradesh. The western Peninsula includes Rajasthan and Gujarat to Maharashtra; the northern, from Uttarakhand to Madhya Pradesh, the Punjab and also Haryana; the eastern, including the plains of West Bengal, Bihar and Orissa; the southern, from Andhra Pradesh to Tamil Nadu and Kerala, inclusive of the Nilgiris. The insular area is outlined by the Andaman and Nicobar Islands and also the Lakshadweep groups of islands, together with littoral parts of states within the waters of the Indian jurisdiction.

Most of the U.T.L. fauna of Lepidoptera are common with that from Sri Lanka and South India in the Indian subregion. Quite a many are also known to occur in the rest of the Indian Peninsular and extrapeninsular areas, too. About 40% of the fauna are represented from the Andaman and Nicobar islands as well as from the Maldives. A total of nearly a dozen of species from the Andamans and only four from the Nicobars are not, however, found to be mutually common. Out of 41 species from the Minicoy Island, majority show far greater affinities with the fauna from the Maldives than that from its northern islands whence only three moths, viz. Euclidisema mygdon, Bradina admixtalis and Hymenia recurvalis, could be explored amongst the present collection. The bulk of the fauna maintains almost an equal ratio between the elements from Sri Lanka - Burma and Sino-Malayan ranges of the Oriental region. While Chasmina sericea is hitherto unknown from the Indian mainland, Epichronistis acrospila and Glyphodes suralis are typically insular in origin, but both these are not so far recorded from Sri Lanka. Vanessa cardui is considered as circum-global in distribution, though it is yet to be recorded from South America; it is also unkonwn from the Minicoy Island. Contrarily, species like Acraea violae, Spalgis epeus, Polytela gloriosa, Phytometra permissa, Acidalia addictaria, A. aspilataria and Epicorces lateritialis are all restricted in the Indian subregion. Only four species, viz., Adoxophyes euryomis, Eucosma leucaspis, Conogethes suralis and Notarcha penthodes, are not definitely known to occur in the Indian mainland, or Sri Lanka and/or elsewhere. The rest of the members, which are mostly of tropical origin, too, further extend to other corners of the globe, as shown in Table-II.
APPENDIX

[List of major angiosperms as food, wherever known, of Lepidoptera mainly from the northern islands of U.T.L., and their available local names in [-]; figure/s in (-) indicating the serial number of species, as per list, feeding on the given plant.]

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Plant Name</th>
<th>Scientific Name</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abutilon indicum</td>
<td>Abutilon indicum</td>
<td>Malvaceae</td>
</tr>
<tr>
<td>2</td>
<td>Aegle marmelos</td>
<td>Aegle marmelos</td>
<td>Rutaceae</td>
</tr>
<tr>
<td>3</td>
<td>Albizzia lebbeck</td>
<td>Albizzia lebbeck</td>
<td>Leguminosae</td>
</tr>
<tr>
<td>4</td>
<td>Artemisia sp.</td>
<td>Artemisia sp.</td>
<td>Asteraceae</td>
</tr>
<tr>
<td>5</td>
<td>Artocarpus communis</td>
<td>Artocarpus communis</td>
<td>Moraceae</td>
</tr>
<tr>
<td>6</td>
<td>Blumea membranacea</td>
<td>Blumea membranacea</td>
<td>Asteraceae</td>
</tr>
<tr>
<td>7</td>
<td>Caesalpinia spp.</td>
<td>Caesalpinia spp.</td>
<td>Leguminosae</td>
</tr>
<tr>
<td>8</td>
<td>Calotropis sp.</td>
<td>Calotropis sp.</td>
<td>Asclepiadaceae</td>
</tr>
<tr>
<td>9</td>
<td>Capparis heyneana</td>
<td>Capparis heyneana</td>
<td>Capparidaceae</td>
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<td>10</td>
<td>Carica papaya</td>
<td>Carica papaya</td>
<td>Papaveraceae</td>
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<td>11</td>
<td>Caryophyllum inophyllum</td>
<td>Caryophyllum inophyllum</td>
<td>Guttiferae</td>
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<td>Cassia fistula</td>
<td>Cassia fistula</td>
<td>Leguminosae</td>
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<tr>
<td>13</td>
<td>C. tora</td>
<td>C. tora</td>
<td>Leguminosae</td>
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<td>14</td>
<td>Casuarina equisetifolia</td>
<td>Casuarina equisetifolia</td>
<td>Casuarinaceae</td>
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<td>15</td>
<td>Cerebera odollum</td>
<td>Cerebera odollum</td>
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<tr>
<td>16</td>
<td>Chloroxylon swietenia</td>
<td>Chloroxylon swietenia</td>
<td>Rutaceae</td>
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<td>17</td>
<td>Citrus medica</td>
<td>Citrus medica</td>
<td>Rutaceae</td>
</tr>
<tr>
<td>18</td>
<td>Citrus sp. (cultivated)</td>
<td>Citrus sp. (cultivated)</td>
<td>Rutaceae</td>
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<tr>
<td>19</td>
<td>Cocos nucifera</td>
<td>Cocos nucifera</td>
<td>Palmae</td>
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<td>20</td>
<td>Cucumis sativus</td>
<td>Cucumis sativus</td>
<td>Cucurbitaceae</td>
</tr>
</tbody>
</table>
21. *Cucurbita minima*  
   [Peerakka]  
   Cucurbitaceae

22. *C. pepo*  
   [Pumpkin] (49)  
   Cucurbitaceae

23. *Crataeva religiosa*  
   Capparidaceae

24. *Cryptolepis buchanani* (4)  
   Asclepiadaceae

25. *C. elegans* (5)  
   Asclepiadaceae

26. *Debregeasia bicolor* (9)  
   Urticaceae

27. *Dregea volubilis* (3)  
   Asclepiadaceae

28. *Eriitrina indica*  
   [Murikku]  
   Leguminosae

29. *Ficus bengalensis* (5)  
   [Peral]  
   Urticaceae

30. *F. glomerata* (5)  
   Urticaceae

31. *F. indica* (5)  
   Urticaceae

32. *F. religiosa* (5)  
   Urticaceae

33. *Glycosmis pentaphylla* (1)  
   Rutaceae

34. Grasses (6,7)  
   Poaceae

35. *Hemidesmus indicus* (5)  
   Asclepiadaceae

36. *Hibiscus cannabinus* (8)  
   Malvaceae

37. *Holarrhena antidysenterica* (5)  
   Apocynaceae

38. *Hoya sp.* (3)  
   Asclepiadaceae

39. *Ichnocarpus frutescens* (5)  
   Apocynaceae

40. *Ipomoea batatus*  
   [Sweet Potato]  
   Convolvulaceae

41. *I. biloba* [Patala]  
   Convolvulaceae

42. *I. rootens* [Mullankizhang]  
   Convolvulaceae

43. *Lantana camara* (11)  
   [Arippu]  
   Verbenaceae

44. *Manihot utilissima*  
   [Tapioca]  
   Euphorbiaceae
<table>
<thead>
<tr>
<th>No.</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Family</th>
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<td>45</td>
<td>Marsdenia tenacissima</td>
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<td>Asclepiadaceae</td>
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<td>Melia sp. [Alivapu]</td>
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<td>Meliaceae</td>
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<td>Modecca palmata (8)</td>
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<td>Passifloraceae</td>
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<td>Morinda tinctoria (13) [Molam]</td>
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<td>Rubiaceae</td>
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<td>49</td>
<td>Moringa pterigosperma [Muringa]</td>
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<td>Moringaceae</td>
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<td>50</td>
<td>Murraya koenigii (1)</td>
<td></td>
<td>Rutaceae</td>
</tr>
<tr>
<td>51</td>
<td>Musa sapientum [Vazha]</td>
<td></td>
<td>Musaceae</td>
</tr>
<tr>
<td>52</td>
<td>Nelsonia campestris (11)</td>
<td></td>
<td>Acanthaceae</td>
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<tr>
<td>53</td>
<td>Nerium odorum (5) [Nerium]</td>
<td></td>
<td>Apocynaceae</td>
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<tr>
<td>54</td>
<td>N. oleander (5)</td>
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<td>55</td>
<td>Palms</td>
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<td>56</td>
<td>Pandanus fascicularis [Kaitha]</td>
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<td>57</td>
<td>Passiflora foetida (8)</td>
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<td>58</td>
<td>Pemphis acidula [Chonnam]</td>
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<td>P. stierongii [Cheruthalam]</td>
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<td>Lythraceae</td>
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<td>Physalis minima [Kurumottam]</td>
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<td>Pithecolobium dulce (2)</td>
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<td>Leguminosae</td>
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<td>Ricinus communis [Avinakku]</td>
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<td>Euphorbiaceae</td>
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<td>Ruta graveoleus</td>
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<td>64</td>
<td>Saccharum officinarum [Sugarcane]</td>
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<td>Poaceae</td>
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<td>Scavola koenigii [Kanni]</td>
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<td>Goodenoviae</td>
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<td>Sesbania aculeata (2)</td>
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<td><em>Spinifex squaroses</em> (19)</td>
<td>[Mulli]</td>
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<td><em>Stachyrarphata indica</em></td>
<td>[Chakkarappullu]</td>
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<td>69</td>
<td><em>Streblus asper</em> (5)</td>
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<td><em>Tamarindus indica</em></td>
<td>[Puli]</td>
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<td>72</td>
<td><em>Taraxacum officianale</em></td>
<td>[Nalukalan]</td>
<td>Asteraceae</td>
</tr>
<tr>
<td>73</td>
<td><em>Techoma stans</em></td>
<td>[Manchapoovu]</td>
<td>Bignoniaceae</td>
</tr>
<tr>
<td>74</td>
<td><em>Terminalia catapa</em></td>
<td>[Alum]</td>
<td>Combretaceae</td>
</tr>
<tr>
<td>75</td>
<td><em>Thespesia maculata</em></td>
<td>[Kinnamparathi]</td>
<td>Malvaceae</td>
</tr>
<tr>
<td>76</td>
<td><em>T. populnea</em></td>
<td>[Cheerani]</td>
<td>Malvaceae</td>
</tr>
<tr>
<td>77</td>
<td><em>Tournefortia argenta</em></td>
<td>[Thamara]</td>
<td>Boraginaceae</td>
</tr>
<tr>
<td>78</td>
<td><em>Trichosanths cucumerina</em></td>
<td>[Kattupatavala]</td>
<td>Cucurbitaceae</td>
</tr>
<tr>
<td>79</td>
<td><em>Tylophora carsona</em> (4)</td>
<td></td>
<td>Asclepiadaceae</td>
</tr>
<tr>
<td>80</td>
<td><em>Vetches</em> (11)</td>
<td></td>
<td>Leguminosae</td>
</tr>
<tr>
<td>81</td>
<td><em>Wagatea spicata</em> (2)</td>
<td></td>
<td>Leguminosae</td>
</tr>
<tr>
<td>82</td>
<td><em>Zanthoxylum rhetsa</em> (1)</td>
<td></td>
<td>Rutaceae</td>
</tr>
<tr>
<td>83</td>
<td><em>Zizyphus jujuba</em></td>
<td>[Elanthappazham]</td>
<td>Rhamnaceae</td>
</tr>
<tr>
<td>84</td>
<td><em>Zorina diphylla</em> (9)</td>
<td></td>
<td>Asteraceae</td>
</tr>
</tbody>
</table>
TABLE I. LOCALITY DATA OF LEPIDOPTERAN FAUNA FROM U.T. LAKSHADWEEP
(Codes used for the localities cross-referred to the material examined under “Systematic Account” ($), material collected “at light”)

<table>
<thead>
<tr>
<th>Codes</th>
<th>Localities decoded</th>
<th>Date of Colln.</th>
<th>Sl.No **</th>
<th>No. of exs. m.</th>
<th>Exp. (in mm.)</th>
<th>Field observations made by the author</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>II</td>
<td>III IV V VI VII</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAGA</td>
<td>Lakshadweep: Agatti, in and around the Agricultural Farm, c 2 kms. south of Guest House</td>
<td>3.iv.1984</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>55-60</td>
</tr>
<tr>
<td>LAGG</td>
<td>Lakshadweep: Agatti, in and around the Guest House Compound</td>
<td>4.iv.1984</td>
<td>3</td>
<td>—</td>
<td>1($)</td>
<td>74</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.iv.1984</td>
<td>4</td>
<td>—</td>
<td>1($)</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.iv.1984</td>
<td>5</td>
<td>—</td>
<td>1($)</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.iv.1984</td>
<td>7</td>
<td>2($)</td>
<td>—</td>
<td>75-76</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.iv.1984</td>
<td>19</td>
<td>1($)</td>
<td>—</td>
<td>37</td>
</tr>
<tr>
<td>LAGN</td>
<td>Lakshadweep: Agatti, towards north of, around a radius of c 2 kms.</td>
<td>8.iv.1984</td>
<td>22</td>
<td>1</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
</tr>
<tr>
<td>------</td>
<td>--------------------------------------------------------------------</td>
<td>--------------</td>
<td>----</td>
<td>---</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>LAVG</td>
<td>Lakshadweep: Amini, Vegetable garden located at c 2 kms. from jetty</td>
<td>13.iv.1984</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>13.iv.1984</td>
<td>8</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>This is the last-surveyed island, c 65 kms. from Kavaratti, lying closest to Kadmat and with vegetation apparently much denser than that of Kadmat. Climate rainy in the morning, being turned sunny in the afternoon. Within a few hours of stay here, a couple of specimens could be captured, while another of <em>Euschema percota</em> was also observed in association with <em>Atrophaneura hector</em> and <em>Danaus genutia</em> amidst bushes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LBAN</td>
<td>Lakshadweep: Bangaram, c 15 kms. north of Agatti</td>
<td>7.iv.1984</td>
<td>19</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attached to Agatti, another islet of tourists' resort with wide open area; fringed with trees and bushy plantations all around its sublittoral belt; also with a large central fresh-water lake along the north-south direction. A few more specimens inclusive of <em>Danaus chrysippus</em>, <em>Geometrid Hemithea</em> sp. and Arctid <em>Creatonotus</em> sp. also seen along the sandy lagoon beach in the sunny climate.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LKDA</td>
<td>Lakshadweep: Kadmat, Agricultural Farm, c 3 kms. north of Dak Bungalow</td>
<td>12.iv.1984</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.iv.1984</td>
<td>19</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.iv.1984</td>
<td>49</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>This island, c 76 kms. from Kavaratti, being provided with a sand bank south cape; soil mostly rocky, supporting rather less dense vegetation; sub-littoral zone in the eastern coast narrow and sandy, being followed by boulder-zone strewn with live corals; climate extremely hot. Both diurnal and nocturnal Lepidoptera noticed at a very poor frequency.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LKDB</td>
<td>Lakshadweep: Kadmat, in and around Dak Bungalow compound</td>
<td>13.iv.1984</td>
<td>7</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>II</td>
<td>III</td>
<td>IV</td>
<td>V</td>
<td>VI</td>
<td>VII</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------</td>
<td>-----------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>LKVD</td>
<td>Lakshadweep: Kavaratti, Defence Area, c 2 kms. south of Govt. Guest House</td>
<td>30.iii.1984</td>
<td>2</td>
<td>—</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>LKVI</td>
<td>Lakshadweep: Kavaratti, Indira Nagar, c 3 kms. east of P.W.D. Rest House</td>
<td>29.iii.1984 29.iii.1984</td>
<td>1</td>
<td>—</td>
<td>1</td>
<td>98</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7</td>
<td>1</td>
<td></td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>LKVV</td>
<td>Lakshadweep: Kavaratti, Vegetable garden, c 3 kms. east of Govt. Tourist Hut.</td>
<td>28.iii.1984 28.iii.1984 28.iii.1984</td>
<td>28</td>
<td>1</td>
<td>—</td>
<td>26</td>
</tr>
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<td>—</td>
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<tr>
<td></td>
<td></td>
<td>42</td>
<td>1</td>
<td></td>
<td>—</td>
<td>22</td>
</tr>
</tbody>
</table>

** Sl. No. of spp. as per list (leg. author)
Table II. Circum-Global Distribution of Lepidopteran Fauna from Lakshadweep

(+, known distribution. N, New record. Column 13 of this table including the neighbouring countries of India: 1, Pakistan; 2, Nepal; 3, Bhutan; 4, Bangladesh; 5, Burma; 6, Sri Lanka; 7, Maldives. ?, Locality doubtful; (*), habitat interalia auctorum.)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of spp. / spp.</th>
<th>Oriental Indian</th>
<th>Palaeartic</th>
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<tr>
<td></td>
<td></td>
<td>Extra-Peninsular</td>
<td>Peninsular</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Western</td>
<td>Eastern</td>
</tr>
<tr>
<td>1</td>
<td>Princeps polytes romulus</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Eurema hecabe contubernalis</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Danaus limniace leopardus</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>Danaus a. aglea</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Euploea c. core</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>Mycalesis mineus polydecta</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>Melanitis leda ismene</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>Acraea virole</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>9</td>
<td>Vanessa cardui</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>10</td>
<td>Spalgis epeus</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>11</td>
<td>Zisula hylax</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>12</td>
<td>Borbo cinnara</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>13</td>
<td>Cphenodes h. hylas</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>14</td>
<td>Macroglloxum citene</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>15</td>
<td>Hippotion rafflesi</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>16</td>
<td>Siriglina scitaria</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>17</td>
<td>Euproctis varians</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>18</td>
<td>Celama squalida</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>19</td>
<td>Uetheisa pulchella</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>20</td>
<td>Polia consanguis</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>21</td>
<td>Polytela gloriosae</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>22</td>
<td>Spodoptera mauritia</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>23</td>
<td>Atheis obiusa</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>24</td>
<td>Chasmina sericea</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>25</td>
<td>Chasmina tibialis</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>26</td>
<td>Lihacodia signifera</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>---</td>
<td>------------------</td>
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<td>------------------------</td>
</tr>
<tr>
<td>1</td>
<td></td>
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</tr>
</tbody>
</table>
MANDAL : Insecta : Lepidoptera

RÉSUMÉ

Un compte rendu taxonomique de list de la faune des Lépidoptères provenant de l'archipel de Lakshadweep de l'Inde dans la mer arabe de l'orient tropical, accompagné d'une discussion sur la biogéographie, se révèle. Parmi 52 espèces en 49 genres sous 17 familles des papillons et des phalènes inclus, 14 espèces ayant pour nouveaux dossiers sont collectionnées des îles du nord par l'auteur, tandis que 41 espèces déjà connues de l'île de Minicoy au sud de la territoire sont consolidées. Trois espèces seules, à savoir, Euclidisema mygdon (Cr.), Bradina admixtalis (Walk.) et Hymenia recurvalis (Fabr.), surviennent communément dans toutes les deux parties du nord et du sud de l'archipel. Une clé pour l'identification des caractères, une annexe de plantes connues comme aliments et deux tableaux s'agissant de la répartition territoriale et mondial respectivement des espèces, en outre des cartes et des planches, sont aussi pourvus.

ACKNOWLEDGEMENT

The author is grateful to the Director, Zoological Survey of India, for kindly providing the laboratory facilities in the work. Thanks are also due to Drs. S. K. Bhattacharya and A. K. Ghosh, Scientists-D, for critically going through the manuscript, to B. Dutta, Scientist-C, Entomology Division, S. K. Ghosh, Scientist-B cum officer-in-Charge, Sri S. K. Ghosh, Asst. Zoologist, and Mrs. M. Mazumdar, Jnr. Zoological Assistant, Lepidoptera Section and Dr. L. K. Ghosh, Scientist ‘B’, of the said institute, for numerous courtesies. Finally, deep sense of gratitude is registered in favour of Dr. V. M. Shamsuddin, Plant Protection Officer, Lakshadweep administration, for extendig his kind and meticulous help in identifying the plants of the areas surveyed at U.T.L. and also imparting other information as material help.

REFERENCES


Publisher : Zoological Survey of India, Calcutta.
Fig. 1. *Papilio polytes romulus*: A, f. (Female) *romulus* (i, dorsal & ii, ventral views); B, f. (Female) *stichius* (i, dorsal & ii, ventral views)

Fig. 2. *Eurema hecabe contubernalis*, w.s.f. *merguiana*: A, dorsal & B, ventral views

Fig. 3. *Danaus limniace leopardus*: dorsal view.

Fig. 4. *Danaus aglea aglea*: dorsal view.
Fig. 5. *Euploea core core*: A, dorsal & B, ventral views.

Fig. 6. *Melanitis leda ismene*: A, d. s. f. *ismene* (i, dorsal; ii, ventral views);
B, w. s. f. *determinata* (i, dorsal & ii, ventral views).

Fig. 7. *Acrea violea*: dorsal view.
Fig. 8 Vanessa cardui: A, dorsal & B, ventral views. Fig. 9. Utetheisa pulchella, f. tenuella: A, dorsal & B, ventral views. Fig. 10. Spodoptera mauritia: dorsal view. Fig. 11. Bradina admixtalis: dorsal view. Fig. 12. Euclidisema mygdon: dorsal view. Fig. 13. Hymenia recurvalis: dorsal view. Fig. 14. Diaphania indica: dorsal view.
Fig. 15. Coastal beach at Kavaratti.  
Fig. 16. Fresh-water pond at Bangaram.  
Fig. 17. A typical view of vegetable garden at Agatti.  
Fig. 18. Coconut Nursery at Amini.
INSECTA : ORTHOPTERA (ADDENDUM)*

H.K. BHOWMIK and S. SUR
Zoological Survey of India, Calcutta - 700 016

INTRODUCTION

The Laccadive group of islands belong to the Malabar biogeographical region of India (Bhowmik, MSS) and its orthopteran fauna should, therefore, show maximum affinity to Deccan peninsula and Sri Lanka and then to Malaysian regions; African influence over its endemic and non-endemic species is far less.

The study of present material collected by one of us (S.S.), during last winter, corroborates the theory in general. The species, A. flavescens is a south Indian and SriLankan one, whereas E. ceylonicus is purely a SriLankan fauna. M. pallipes is a Malaysian and Indonesian one and A. s. simulatris is mostly an African species. The Indian influence is exhibited along with other oriental countries by the presence of A. humbertianus, C. innotabilis and A.c. crenulatea etc.

The insular habitats of these islands are monotonous and there is very little bush or herb on the sand dune beach which could sustain only few varieties of grasshopper population. This accounts for lesser chance of speciation; in fact, there is no endemic species of this fauna in these islands.

SYSTEMATIC ACCOUNT

Order ORTHOPTERA
Family ACRIDIDAE

1. Anacridium flavescens (Fabricius)


Material : 5♂, 3 ♀; Minicoy Island; 15-16.2.86.

Remarks : Known previously from Tamil Nadu, Andhra Pradesh, Orissa (Barkuda Island) in India and Sri Lanka, the species seems to be the first record from Western India.

It was collected in February from sparsely wild herbs. Previously Bhowmik (1983) 1985 (Indian Mus. Bull., 18 : 70 - 71, figs K, L) collected it in September from Chilka Lane. This points out that the species is an annual-breeder.

The present material agrees well with known account but smaller in size (female 61 - 67 mm vs. 70 - 71 mm).

2. Acrotylus humbertianus Saussure


Material : 7 ♂; 5 ♀; Kavaratti Island, 8.2.86.

* Additional material not included in the preceding paper by Hazra et al is being reported here. (Ed.)
Remarks: A very common species in India. Also available in Afghanistan and Sri Lanka.

3. Catantops innotabilis (Walker)

Material: 2♂; Minicoy Island; 12-2.86. 3♂, 3♀ (and 1♀ nymph); Kavaratti; 7.2.86.

Remarks: A very common species in India, Afghanistan, Korea and Sri Lanka.

4. Aiolopus simulatris simulatris (Walker)

Material: 2♂, 15♀ (and 1♀ nymph); Minicoy Island; 12-19.2.86. 12♂, 12♀; Kavaratti Island; 8.2.86.

Remarks: Described from south India, the species is now widespread northwards from eastern Tanzania to eastern Mediterranean, Arabian peninsula, more or less throughout India, Burma, Islands of Indian Ocean westwards to Sechelles. Its description agrees well with revisional works of Hollis (1968. Bull. L.r. Mus. nat. Hist. (Ent.), 22 (7): 320, figs.). The species is an annual breeder.

Family GRYLLIDAE

5. Ectatoderus ceylonicus Chopard

Material: 1♂, 1♀ (and 1♀ nymph); Minicoy Island; 14.2.86. 1♂, 1♀; Kavaratti Island; 5-6.2.86.

Remarks: The species was described from Sri Lanka. Its availability in Laccadive though interesting is not unlikely.

6. Metioche pallipes Stal
1861. M. pallipes Stal, Eugenies Resa, Ins., 316.

Material: 2♂ 2♀; Kavaratti Island; 6.2.86.

Remarks: An Malaysian and Indonesian species, also recorded earlier from the Great Nicobar Island (Bhowmik, 1970, J. Zool. Soc. India, 22 (1 & 2): 84, figs) is now recorded from another insular habitat.

Family PYRGMORPHIDAE

7. Atractomorpha crenulata crenulata (Fabricius)

Material: Numerous examples of both sexes; Minicoy and Kavaratti Islands; 14-15.2.86.

Remarks: This subspecies is found in India, Sri Lanka, Burma, Thailand to N.W. Sumatra. It is very common in India.

ACKNOWLEDGEMENT

The authors owe to the Director, Zoological Survey of India, for facilities provided for working out the collection.

Publisher: Zoological Survey of India, Calcutta.
INSECTA : DERMAPTERA

G. K. SRIVASTAVA
Zoological Survey of India, Calcutta

Burr (1902) recorded a single species of Dermaptera, *Anisolabis annulipes* Lucas, from Minikoi on a male specimen. However, this identification should be treated with some reserve since the concept of male genitalia in the taxonomy of the Order was not introduced at that time. The present report is based upon a small collection comprising 2 species and 8 examples. Of these *Euborellia stali* (Dohrn), though represented by females, could be easily identified. The other one belongs to the genus *Euborellia*. Perhaps a new species is represented but it is left unnamed owing to the poor condition of the male specimen. However, a brief description is provided which would help the future workers in recognising the species.

1. *Euborellia stali* (Dohrn)


*Diagnostic characters* : General colour blackish brown to black; antennae with one or two antepical segments yellow but position variable.

Pronotum gently widened posteriorly. Elytra abbeviated as narrow ovate flaps on mesonotum. Wings wanting. Sides on abdominal segments 6th to 9th acute and carinate and forceps gently incurved in male and simple and straight in female. Measurements : Length : Body - 8.5 to 10.5 mm and Forceps - 1.2 to 2.5 mm.

*Distribution* : World wide.

2. *Euborellia sp.*

*Material examined* : INDIA : Union Territory of Lakshadweep, North of Agatti I.d, along the coastal embankment, 1 male (genitalia mounted between two coverslips and pinned with the specimen), 1 female and 1 nymph, 8.v.1984, D. K. Mandal coll.

*Male* : General colour blackish brown, abdomen lighter in colour; legs pale.

Head about as long as broad. Antennae 13 segmented or more. Pronotum about as long as broad, all margins straight, a trifle broader posteriorly. Apterous. Anbomen faintly punctulate, sides of segments 6th to 9th acute angled, striaite, carinate, but carinae weak on 6th segment. penultimate sternite rounded posteriorly. Ultimate tergite transverse, faintly punctulate. Forceps trigonal in basal 1/3, contiguous, tapering...
apically, bent in apical 1/3, internal margin serrated. Genitalia as seen in fig. 5. Length: Body - 7.0 mm and Forceps - 1.4 mm.

Figs. 1, 2: *Euborellia stali* (Dohrn), Female, 1. Anterior portion of body; 2. Ultimate tergite and forceps; Figs. 3-6: *Euborellia* sp., Male, 3. Sides of abdominal segments; 4. Hind portion of body, left branch of forceps missing; 5. A portion of genitalia; Female 6. Ultimate tergite and forceps.

*Female*: Agrees with male in most characters except that forceps simple and straight.

Length: Body - 7.4 mm and Forceps - 1.5 mm.
Remarks: The above species comes close to *Euborellia compressa* Borelli from Africa & India in having rectangular parameres but differs in having both the distal lobes flexed forward with a rounded apical dentate pad.

REFERENCES

INSECTA : DICYOPTERA

K. P. MUKHERJEE and A. K. HAZRA
Zoological Survey of India, Calcutta.

Family EPILAMPRIDAE
Subfamily EPILAMPRINAE

1. Rhabdoblatta lineaticollis (Bolivar)


   **Description** : Head yellow with sparse dark brown spots; palpi yellow, fifth joint nearly one and half times the fourth; antennae yellow; pronotum concolourous with head, mediolongitudinal stripe extends its whole length; legs yellow; wings yellow, veins dark brown; abdomen yellow with longitudinal dark brown stripes in the middle on the dorsum; supra anal plate hemi-spherical; cerci yellowish-brown with dark brown apex.

   **Distribution** : India : Tamil Nadu, Kerala.

2. Thorax porcellana Saussure


   **Description** : Head yellowish-brown with dark brown spots; antennae concolourous with head but apex of all the segments of flagellomere darker; pronotum concolourous with head, anterior margin lighter without dark spots; wings with dark brown spots of various sizes; legs yellow with empodium and apex of claws darker; abdominal tergites yellow with dark brown infuscations, supra anal plate transverse with deeply invaginated hind margin; cerci yellowish-brown with dark brown apex.

   **Distribution** : India (Orissa, Karnataka, Goa, Kerala, Tamil Nadu) and Sri Lanka.

3. Haanina patinifera (Bolivar)
Material studied: 1 ex., north of Agatti Island along the coastal embarkment, 8.iv.1984.

Description: Head black and yellow; fifth palpal joint one and half times the fourth; pronotum yellow laterally, rest dark brown; yellowish-brown, fore femur with a comb of bristles on apical half ventrally; wings yellow bearing dark brown patches; abdomen concolourous with legs having dark brown spots; cerci dark brown with concolourous hairs.

Distribution: India (Tamil Nadu, Kerala).

Family BLATTELLIDAE
Subfamily BLATTELLINAE

4. Blattella germanica (Linnaeus)

1767. Blatta germanica Linnaeus, Syst. naturae, 1 (2) : 688.

Material studied: 2 exs., north of Guest House, Agatti Island, 8.iv.1984. Examples were collected from Coconut tree bark.

Description: The common names of this species are Crotonbug, Steambug, Steamfly, the German roach. It is pestiferous and Ovo-viviparous. The colour of the body is pale yellowish-brown with two darker brown longitudinal marks on the pronotum. Margins of the pronotum straw yellow. The wings are fully developed and usually longer than the body.

Distribution: Widely distributed species.

SUMMARY

The present paper is based on a small collection of Blattids collected from different localities of Lakshadweep by D. K. Mandal & party. The study reveals 4 species representing 4 genera and 2 families. All the species have been recorded here from Lakshadweep.

ACKNOWLEDGEMENT

Authors are thankful to the Director, Zoological Survey of India for providing laboratory facilities. Thanks are also due to Dr. A. K. Ghosh, Joint Director of the same organisation for kindly placing the materials to the authors.
INSECTA : DIPTERA

P. PARUI and M. DATTA
Zoological Survey of India, Calcutta

INTRODUCTION

Our knowledge on insects from the Lakshadweep, a group of islands in the Arabian sea, south-west of the Indian peninsula, is scarce and no entomologists have ever paid much attention to reveal the fauna since the pioneering contribution by Gardiner (1903). Nevertheless importance lying in Diptera, there are merely one or two sprinkling records of mosquitoes and flies from the Lakshadweep (Bezzi, 1924; Roy & Brown, 1941; Pont, 1977; Rao 1984).

The present paper deals with a small collection of Diptera made by Mr. D. K. Mandal and party of the Zoological Survey of India, Calcutta in 1984. This brings about an addition to the earlier records from the Lakshadweep.

SYSTEMATIC ACCOUNT

Family DOLICHOPODIDAE
Subfamily SCIAPODINAE

1. Chrysosoma sp.

Material examined : 1♀ from vegetable garden, 3 km. east of tarish hut, Kavaratti, 28.iii.1984.

Remarks : The specimen could not be identified for its badly damaged condition.

Family MUSCIDAE
Subfamily MUSCINAE

2. Musca (Musca) domestica Linnaeus


Material examined : 2♂, 4♀, Indira Nagar Kavaratti, 29. iii. 1984.

Remarks : The species is cosmopolitan and has earlier been recorded from Maldives islands (Pont, 1977).

Family SARCOPHAGIDAE
Subfamily SARCOPHAGINAE

3. Parasarcophaga (Parasarcophaga) albiceps (Meigen)


Remarks: This is a widespread Oriental species and occurs also in the Palaearctic and Australian regions, but this is recorded for the first time from the Lakshadweep.

DISCUSSION

Attempt to discuss anything about the Diptera fauna of the Lakshadweep with this small collection is undoubtedly a daring task but a few points are certainly worthy of mention. Gardiner’s work (1903) has proved that the insect-fauna of the Lakshadweep is quite rich and several elements are different from those occurring in the Indian peninsula. Although impoverished in families and species, this collection has revealed that the family Tethinidae of which only 7 species are Oriental and none has so far been reported from India, occurs here. Unfortunately, the lone specimen can not be determined even up to the generic level due to bad preservation. There is still another family Chloropidae which is also unrecorded from the Lakshadweep is but present in this collection in deplorable condition. Likewise, it happens to represent many a family occurring in the Indian peninsula and the rest of the Ceylonese subregion of the Orient upon further collecting.

SUMMARY

The paper records occurrence of the families Dolichopodidae, Muscidae, and Sarcophagidae, the latter being represented by Parasarcophaga (P.) albiceps (Meigen) for the first time from the Lakshadweep.

ACKNOWLEDGEMENTS

We are grateful to the Director, Zoological Survey of India, Dr. S. K. Bhattacharyya, Scientist-SF and Dr. S. K. Tandon, Scientist-SE, Zoological Survey of India, Calcutta, for placing the material at our disposal and for providing facilities for work. We owe much to Dr. A. K. Ghosh, Scientist-SF, Zoological Survey of India, for his keen interest and kind suggestion to reveal the fauna of the Lakshadweep.

REFERENCES


INSECT : MANTODEA

T.K. MUKHERJEE* and A.K. HAZRA
Zoological Survey of India, Calcutta - 700 053.

INTRODUCTION

Mantid fauna of the island has not been properly explored although very recently the mantid fauna of the mainland have been studied by Mukherjee and Hazra (1985). A party of Zoological Survey of India led by D. K. Mandal in April, 1984, collected a total of 5 examples belonging to single species.

SYSTEMATIC ACCOUNT

Order MANTODEA
Family MANTIDAE
Subfamily MANTINAЕ
Tribe Mantini

Hierodula (Hierodula) tenuidentata Saussure, 1869

1869. Hierodula tenuidentata Saussure, Mt. Schweiz. ent. Ges. 3: 68

Frontal sclerite a little wider than high. Pronotum narrowed posteriorly after coxal joint and then parallel except near base; prosternum usually with two blackish transverse bands near base; metazona less than twice longer than prozona.

In anterior leg, coxa with 5-6 marginal spines with few spinules; femur with deep brownish to blackish discoidal and larger internal spines; all spines are black at tips. Fore wing hind and wing longer than body, former opaque, latter hyaline.

Measurements (in mm):

<table>
<thead>
<tr>
<th></th>
<th>Body</th>
<th>Pronotum (L/B)</th>
<th>Metazona</th>
<th>Fore wing</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>53-64</td>
<td>19/7.5</td>
<td>12</td>
<td>46</td>
</tr>
<tr>
<td>female</td>
<td>75</td>
<td>23/8.5</td>
<td>15.5</td>
<td>55</td>
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</tbody>
</table>


Distribution : Throughout the mainland of India.

Remarks : The two males collected are of different sizes and measurement has been given of the larger one. The nymphs are apparently one month old. The assemblage of

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nymphs and adults and a gradation probably indicate intermediate state of breeding season. Hence occurrence of adult species in Western Ghats in May-July may coincide with this Island.

Another species *Hierodula simulacrum* Serville-Audinet was recorded earlier by Burr, 1902 from Minikoi.

**SUMMARY**

*Hierodula (Hierodula) tenuientata* Saussure, 1869 recorded for the first time from the island, with full description.

**ACKNOWLEDGEMENTS**

Authors are thankfull to D. K. Mondal and his party for collection of the specimen and also to the Director, Zoological Survey of India for providing laboratory facilities.

**REFERENCES**


INSECTA : COLEOPTERA

S. BISWAS and P. MUKHOPADHYAY
Zoological Survey of India, Calcutta - 700 053

A small collection of beetles from Lakshadweep Islands was made available to us for study. Materials include 19 examples belonging to nine species under 9 genera of nine different families. All species except one were known from Indian mainland but none was recorded from Lakshadweep Islands earlier. A systematic account of the species studied is given below.

Order COLEOPTERA
Suborder ADEPHAGA
Family DYRISCIDAE

1. Eretes stictus (Linnaeus)


Distribution : Very widely distributed species known from almost all parts of the world.

Suborder POLYPHAGA
Family STAPHYLINIDAE

2. Paederus fuscipes Curtz.


Distribution : Widely distributed species recorded from Europe, Africa, Australia and Asia. It was recorded from different parts of India and also from Sri Lanka.

Family SCARABAEIDAE

3. Oryctes rhinoceros (L.)


Distribution : The species is known from Burma, Indonesia, Thailand, Singapore, Taiwan, Korea, Hong Kong, Philippines and India. In India the species was recorded from Tamilnadu, Kerala, Maharashtra, Karnataka and West Bengal.

Remarks : This species is a serious pest of Coconut and may turn out to be a potential danger to the coconut plantation.
4. Onthophagus difficilis Walker
Distribution : The species was known from South India : (Kodaikanal) and Sri Lanka.

5. Aphodius (Nialus) lividus (Olivier)
1789. Scarabaeus lividus Olivier, Ent. col. 1 (3) : 86.
Distribution : The species is very widely distributed, almost cosmopolitan.

6. Macroura longipennis (Mots.)

7. Oryzaephilus mercator (Fauvel).
Distribution : Cosmopolitan, Africa, Asia, America, (North and South), Australia and Europe. In India the species is known from West Bengal, Bihar, Rajasthan and Maharashtra.

8. Notoxus sp.
Remarks : The species under report may possibly belongs to an undescribed species but specific name has not been used here. It will be dealt separately elsewhere along with other Indian species of the genus. This species is closely related to Notoxus noctivagus Kr and N. peregrinus Kr described from Calcutta (W.B.) and Purneah (Bihar) respectively but differs in (i) size being comparatively smaller, carina along the inner border in epistome and eyes indistinct, head deep brownish black (ii) fine crenulation throughout the extended portion of prothorax and more arrow headed apex, body densely pubescent with fine, short pubescence (iii) band on elytra at apex and below the middle different.
Family CHrysomelidae

9. Aulacophora cincta (F.)


Distribution : The species earlier known from South India (Nilgiri hills, Malabar) and Sri Lanka.

ACKNOWLEDGEMENTS

Authors are thankful to the Director, Zoological Survey of India for the opportunity to study the material. We are also thankful to Mr. D. K. Mandal for his good and interesting collection from this Islands.
INTRODUCTION

In the beginning of this century an expedition was undertaken to Maldives and Laccadive Archipelagoes under the leadership of J. Stanley Gardiner (1903 and 1906). The collections of molluscs, which were made mostly from Maldives and only a few from Minicoy were studied by Smith (1903, 1906), Eliot (1906), Hoyle (1906), and Melvill (1909). A total of about 444 species were reported from both the archipelagoes. But of these, the molluscs from Minicoy numbered about 85 species only. Hornell (1921) gave a list of the molluscan fauna of the Laccadive islands, which included 108 species. The later works on molluscs of Lakshadweep were of recent origin. The collections made by the exploratory fishing vessel R. V Varuna were reported by Silas (1970). An ecological survey of the Minicoy Atoll was made by Nagabhushanam and Rao (1972) to which a long list of molluscs (species) was also appended. Nair & Dharmaraj (1983, 1986) reported 19 species of wood boring molluscs from Lakshadweep Archipelago. Panicker (1978) gave an account of cowry shells (55 species) which he had collected in the islands during the period from 1971 to 1974. Mallik (1976, 1979) published an account of the grain size variation and also of the collections made by him from Kalpeni and Kavaratti Atolls, which were in fact identified by us. There are other reports which deal with one or three, new or rare species of molluscs from these islands (Sakthivel, 1974; Namboodiri and Sivadas, 1980; and Virabhadr Rao et al 1975).

The species which we have included in this report are based on collections physically examined by us. These molluscs were collected by recent survey parties of the Zoological Survey of India during the year 1980 (B. P. Halder), 1983 (G. C. Rao), 1984 (B. P. Halder) and 1986 (D. R. K. Sastry). Besides these collections we have also included the species, which were reported by Mallik (1979). There are no other collection in the Zoological Survey of India originating from Lakshadweep.

A consolidated list of molluscs from Lakshadweep islands based on collections and literature record (the sources of which are given in the list) includes 424 species. But we could actually examine specimens belonging to 168 species. We may point out here that if an intensive survey with special reference to molluscs were to be made, there is a possibility to substantiate the earlier reports of several species and even to add a few more species to the list. When we take into cognizance the rich malacofauna of Maldives we should expect more species of molluscs from Lakshadweep Archipelago. Further surveys in the coral reefs of various islands of the Lakshadweep Archipelago should be a rewarding experience, as far as molluscs are concerned.
LIST OF MOLLUSCS FROM LAKSHADWEEP ISLANDS
(* Indicates species from literature only)

Class POLYPLACOPHORA

1. Family CHITONIDAE
1. Chiton granoradiatus Leloup 2. * C. maldivensis (Smith)

Class GASTROPODA

Order ARCHAEOGASTROPODA

2. Family HALIOTIDAE
5. * Haliotis (Ovinotis) ovina (Gmelin)

3. Family FISSURELIDAE

4. Family TROCHIDAE
10. * Cantharidus maldivensis (Smith) l 11. Euchelus atratus (Gmelin)
12. * Gibbula pulcherrima (A. Adams) l 13. Tectus (Tectus) pyramis Born
18. * T (T.) obesus Reeve

5. Family STOMATELLIDAE
19. Stomatella (Gena) varia (A. Adams)
20. * S. (G.) auricula Lamarck

6. Family TURBINIDAE
21. Turbo (Marmarostoma) argyrostomus Linnaeus
22. Astraea (Astralium) semicostata (Kiener)

7. Family NERITIDAE
23. Nerita (Thelisostyla) albicilla Linnaeus
24. N. (Amphinerita) polita Linnaeus
25. N. (Ritena) plicata Linnaeus
26. N. (R.) semirugosa Recluz
27. *N. undata* Linnaeus
28. *N. squamulata* Le Guillou
29. *Pseudonerita amoena* (Gould)

Order MESOGASTROPODA

8. Family LITTORINIDAE
30. *Littorina (Littoraria) undulata* Gray
31. *L. (Littorinopsis) scabra* (Linnaeus)
32. *L. glabrata* Philippi
33. *Peasiella tantilla* (Gould)

9. Family THIARIDAE
34. *Thiara (Melanoides) tuberculata* (Müller)

10. Family PLANAXIDAE
35. *Planaxis sulcatus* (Born)
36. *Angiola lineata* (de Costa)

11. Family MODULIDAE
37. *Modulus tectum* (Gmelin)

12. Family POTAMIDIDAE
38. *Terebralia palustris* (Linnaeus)

13. Family CERITHIIDAE
39. *Cerithium columna* Sowerby
40. *C. echinatum* Lamarck
41. *C. lacteum* Kiener
42. *C. morus* Lamarck
43. *C. nodulosum* Bruguier
44. *C. rugosum* Wood
45. *C. salebrosum* Sowerby
46. *C. piperatum* Sowerby
47. *C. tuberculatum* Linnaeus
48. *Clypeomorus batillariaeformis* Habe & Kosuge
49. *C. traillii* Sowerby
50. *Rhinoclavis fasciatus* (Bruguier)
51. *R. articulatus* (A. Adams and Reeve)
52. *R. kochi* (Philippi)
53. *R. (R.) sinensis* (Gmelin)

14. Family TRIPHORIDAE
54. *Triphoris cingulifera* Pease
55. *T elegans* Hinds
56. *T* corrugatus Hinds¹
57. *T* excellens Smith¹
58. *T* sculptus Hinds¹

15. Family JANTHINIDAE

59. *Janthina fragilis* Lamarck¹,⁷

16. Family EULIMIDAE

60. *Balcis inflexa* (Pease)

17. Family CYPRAEIDAE

(All literature records by K.C.P.)

61. *Cypraea semiplota* (Mighels) 62. *C. tigris* Linnaeus
63. *Bistolida hirundo* (Linnaeus) 64. *B. stolida* (Linnaeus)
65. *Blasicrura subteres* (Weinkauff) 66. *Cribaria cibraria* (Linnaeus)
67. *Chelycypraea testudinaria* (Linnaeus) 68. *Erosaria caputserpentis* (Linnaeus)
69. *E. erosa* (Linnaeus) 70. *E. helvola* (Linnaeus)
71. *E. labrolineata* (Gaskoin) 72. *E. ocellata* (Linnaeus)
73. *E. nebrites ceylonensis* Schielder & Schilder 74. *E. poraria* (Linnaeus)
75. *Erronea caurica* (Linnaeus) 76. *E. errones* (Linnaeus)
77. *E. listeri* (Gray) 78. *E. walkeri* (Sowerby)
79. *Luria isabella* (Linnaeus) 80. *Lyncina argus* (Linnaeus)
81. *L. carneola* (Linnaeus) 82. *L. lynx* (Linnaeus)
83. *L. vitellus* (Linnaeus) 84. *Mauritia arabica* (Linnaeus)
85. *M. depressa* (Gray) 86. *M. eglantina* (Duclos)
87. *M. maculifera* (Schilder) 88. *M. mauritiana* (Linnaeus)
89. *M. histrio* (Gmelin) 90. *M. scurra* (Gmelin)
91. *Melicerona felina* (Gmelin) 92. *Monetaria annulus* (Linnaeus)
93. *M. moneta* (Linnaeus) 94. *Mystaponda camelopardalis* (Perry)
95. *Notadusta punctata* (Linnaeus) 96. *Palmadusta asellus* (Linnaeus)¹
97. *Purpuradusta fimbriata* (Gmelin) 98. *P. gracilis* (Gaskoin)
99. *Pustularia cicercula* (Linnaeus) 100. *P. globulus* (Linnaeus)
101. *Staphylaea nucleus* (Linnaeus) 102. *S. staphylaea* (Jousseaume)

103. *Talparia talpa* (Linnaeus)

18. Family TRIVIIIDAE

104. *Dolichupis (Cleotrivia) globosa cosmoi* (Dautzenberg)

19. Family STROMBIDAE

105. *Strombus (Gibberulus) gibberulus* Linnaeus

106. *S. (Canarium) mutabilis* Swainson

107. *S. dentatus* Linnaeus

108. *S. lamarckii* Gray

109. *S. lentiginosus* Linnaeus

110. *Lambis (Lambis) lambis* (Linnaeus)

111. *L. (Harpago) chiragra chiragra* (Linnaeus)

112. *Terebellum terebellum* Linnaeus

20. Family VANIKORIDAE

113. *Vanikoro cancellata* (Lamarck)

21. Family HIPPICIDAE

114. *Saptadanta nasika* Prashad & Rao

22. Family AMALTHEIDAE

115. *Cheilea porosa* (Reeve)

23. Family NATICIDAE


118. *N. euzona* Recluz

119. *N. robillardi* Sowerby

120. *Polinices maurois* Lamarck

121. *P. (Polinices) tumidus* (Swainson)

122. *P. (Mammilla) melanostomus* (Gmelin)

24. Family CASSIDAE

123. *Casmaria ponderosa ponderosa* (Gmelin)

124. *Cassis cornuta* Linnaeus

125. *Cypraeccass (C.) rufa* (Linnaeus)

25. Family TONNIDAE


128. *T olearium* Lamarck

129. *T perdix* (Linnaeus)
26. Family CYMATIIDAE

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<td>Charonia (C.) tritonis (Linnaeus)</td>
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<td>Cymatium parthenopeum (von Salis)</td>
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<td>C. pileare (Linnaeus)</td>
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<td>C. nicobaricum (Roeding)</td>
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<td>C. (Ranularia) sinense (Reeve)</td>
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<td>C. vespaceum (Lamarck)</td>
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<td>136</td>
<td><em>C. tuberosum Lamarck</em></td>
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<td><em>T. (Persona) anus Linnaeus</em></td>
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27. Family FICIDAE

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28. Family BURSIDAE

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<td><em>B. rubeta</em> (Linnaeus)</td>
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Order NEOGASTROPODA

29. Family MURICIDAE

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<td><em>Haustellum haustellum</em> (Linnaeus)</td>
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<td>Murex tribulus Linnaeus</td>
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<td><em>M. aculeatus</em> Lamarck</td>
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<td><em>M. pleurotomoides</em> Reeve</td>
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<td>M. uva Roeding</td>
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<td>D. (Ricinella) clathrata miticula Lamarck</td>
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<td>D. (Drupina) lobata (Blainville)</td>
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<td>Drupella cornus (Roeding)</td>
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<td>Cronia (Ergalatax) contracta (Reeve)</td>
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<tr>
<td>168</td>
<td>Rapanatrapiformis (Born)</td>
<td></td>
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<tr>
<td>169</td>
<td>Purpura panama (Roeding)</td>
<td></td>
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<tr>
<td>170</td>
<td>Thais armigera (Link)</td>
<td></td>
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<tr>
<td>171</td>
<td>T hippocastanum (Linnaeus)</td>
<td></td>
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<tr>
<td>172</td>
<td>T intermedia (Kiener)</td>
<td></td>
</tr>
<tr>
<td>173</td>
<td>T tuberosa (Roeding)</td>
<td></td>
</tr>
</tbody>
</table>
30. Family CORALLIOPHILIDAE

174. *Coralliophila suturalis* A. Adams
176. *C. neritoidea* (Lamarck)
178. *M. cumingii* Deshayes

175. *C. madreporarium* Philippi
177. *Magilus ellipticus* Sowerby

31. Family PYRENIDAE

179. *Pyrene* (*Columbella*) *variants* (Sowerby)
181. *Columbella galaxias* Reeve

32. Family BUCCINIDAE

182. *Cantharus* (*Pollia*) *undosus* (Linnaeus)
184. *E. mendicaria* (Linnaeus)
186. *Phos roseatus* Hinds

183. *Engina lineata* (Reeve)
185. *E. rawsoni* Melvill
187. *P. textilis* A. Adams

33. Family NASSARIIDAE

188. *Nassarius* (*Alectrion*) *papillosus* (Linnaeus)
190. *Hebra horridus* (Dunker)
192. *N. (Plicarcularia) graniferous* (Kiener)
194. *N. disparalis* (Smith)
196. *Bulbia tranquabarica* (Roeding)

189. *N. (Niotha) echinatus* (A. Adams)
191. *Nassarius* (*Niotha*) *stigmarius* (A. Adams)
193. *N. maldivensis* (Smith)
195. *N. (Niotha) ecstilbus* (Melvill & Standen)

34. Family FASCIOLARIIDAE

197. *Peristernia nassatula* (Lamarck)
199. *Lairurus belcheri* (Reeve)
201. *L. smaragdulus* (Linnaeus)

198. *Fasciolaria* (*Pleuroloca*) *filamentosa* (Roeding)
200. *L. gibbulus* (Gmelin)
202. *L. craticulatus* Linnaeus

35. Family OLIVIDAE

203. *Oliva erythrostroma* Lamarck

204. *O. gibbosa* Born
36. Family VASIDAE

205. Vasum (Vasum) ceramicum (Linnaeus)

206. V. (V.) turbinellus (Linnaeus)

207. * Turbinella pyrum Linnaeus

37. Family HARPIDAE

208. Harpa amoretta Roeding

209. * H. ventricosa Linnaeus

38. Family VOLUTIDAE

210. * Voluta lapponica Linnaeus

39. Family CANCELLARIIDAE

211. Cancellaria sp.

40. Family MARGINELLIDAE

212. Marginella angustata Sowerby

213. * M. picturata Nevill

41. Family MITRIDAE

214. Mitra (Nebularia) aurantia aurantia (Gmelin)

215. M. (N.) chrysalis Reeve

216. M. (N.) cucumerina Lamarck

217. M. (N.) tabanula Lamarck

218. M. (N.) turgida Reeve

219. M. (Strigatella) acuminata Swainson

220. M. (S.) litterata Lamarck

221. M. (S.) pellisserpentis Reeve

222. M. (S.) scutulata (Gmelin)

223. * M. tessellata Martyns

224. * M. (Scabricola) scabriuscula Linnaeus

225. * M. (Strigatella) acuminata Swainson

226. * M. (Cancilla) insculpta A. Adams

227. * M. (Costellaria) exasperata Gmelin

228. * Cylindra sinensis Reeve

42. Family TURRIDAE

229. * Drillia (Clavus) exasperata Reeve

230. * Daphanella saturata Reeve

43. Family CONIDAE

231. Conus aulicus Linnaeus

232. C. coronatus Gmelin

233. C. canonicus Hwass in Bruguier

234. C. ebraeus Linnaeus
235. *C. emaciatus* Reeve

237. *C. litteratus* Linnaeus

239. *C. miles* Linnaeus

241. *C. rattus* Hwass in Bruguiere

243. *C. arenatus* Hwass in Bruguiere

245. *C. ceylonensis* Hwass in Bruguiere

247. *C. eburneus* Hwass in Bruguiere

249. *C. herbeus* Linnaeus

251. *C. nussatella* Linnaeus

253. *C. monachus* Linnaeus

255. *C. lineatus* Chemnitz

44. Family TEREBRIDAE

256. *Terebra maculata* (Linnaeus)

258. *T affinis* Gray

260. *T dimidata* Linnaeus

262. *T oculata* Lamarck

264. *T duplicata* Reeve

Order ENTOMOTAENIATA

45. Family PYRAMIDELLIDAE

265. *Pyramidella sulcata* (A. Adams)

267. *Obeliscus dolabratus* Linnaeus

Order CEPHALASPIDEA

46. Family ACTEONIDAE

268. *Pupa solidula* (Linnaeus)

270. *P. glabrata* (Reeve)

47. Family PHILINIDAE

272. *Cryptophthalmus minikoiensis* Smith

48. Family ACERIDAE

273. *Volvatella cincta* Nevill
49. Family BULLIDAE

274. * Bulla ampulla * Linnaeus\(^1,16\)  
275. * B. vernicosa * Gould\(^7\)

50. Family ATYIDAE

276. * Atys cylindrica * Helbling\(^16\)  
277. * A. naucum * Linnaeus\(^7,16\)
278. * A. succisa * Ehrenberg\(^16\)

51. Family CAVOLINIDAE

279. * Creseis bulgia * Sakthivel\(^15\)

Order BASOMMATOPHORA

52. Family SIPHONARIIDAE

280. Siphonaria funiculata * Reeve

53. Family ELLOBIIIDAE

281. * Melampus fasciatus * Deshayes\(^7\)

54. Family PLANORBIDAE

282. Indoplanorbis exustus * (Deshayes)

55. Family SUCCINEIDAE

283. * Succinea vitrea * Pfeiffer\(^16\)

56. Family ENIDAE

284. Rhachis punctatus * (Anton)

57. Family SUBULINIDAE

285. Lamellaxis gracile * (Hutton)

58. Family ARIOPHANTIDAE

286. * Sitala vagata * Smith\(^16\)

Order ANASPIDEA

59. Family APLYSIIIDAE

287. Aplysia * (Varria) cornigera * Sowerby  
288. Dolabella ecaudata * Rang
Order SJACCOGLOSSA
60. Family OXYNOIDAE

289. *Oxynoe delicatula* Nevill

Order NUDIBRANCHIA
61. Family HEXABRANCHIDAE

290. *Hexabranchus digitatus* Eliot

62. Family DORIDIDAE

291. *Chromodoris elizabethina* Bergh
292. *C. pustulans* Bergh

293. *Glossodoris festiva* (Adams)
294. *Discodoris concinna* (Alder & Hancock)

295. *D. pardalis* (Alder & Hancock)
296. *Asteronotus caespitosus* (van Hasselt)

297. *Trippa ornata* Bergh

63. Family NOTODORIDIDAE

298. *Notodoris gardineri* Eliot

64. Family DENDRODORIDIDAE

299. *Dendrodoris nigra* Stimpson

65. Family PHYLLIDIIDAE

300. *Phyllidia (Phyllidia) varicosa* Lamarck
301. *P. (Phyllidella) zelanica* Kelaart

66. Family PLEUROPHYLLIDIDAE

302. *Pleurophyllidia gracilis* Bergh

67. Family DOTONIDAE

303. *Doto indica* Bergh

68. Family PLEUROBRANCHIDAE

304. *Cyerce nigra* Bergh

69. Family HERMAEIDAE

305. *Hermaea minor* Bergh
70. Family GLAUCIDAE

306. * Glaucus sp.¹

Order SOLEOLIFERA

71. Family ONCHIDIDAE

307. Onchidium verruculatum, Cuvier

Class BIVALVIA

Order ARCOIDA

72. Family ARCIDAE

308. Arca avellana Lamarck¹

309. * A. symmetrica Reeve¹,¹⁶

310. * Barbatia helblingi (Bruguiere) 311. * B. tenella (Reeve)¹,¹⁶

312. B. amygdalum tostum Roeding 313. Acar plicata (Dillwyn)

73. Family NOETIIDAE

314. * Striarca lactea (Linnaeus)¹

Order LIMOPSACEA

74. Family Limopsidae

314. * Limpsis indica Smith¹⁶

Order MYTILOIDA

75. Family MYTILIDAE

316. Modiolus philippinarum Hanley 317. * M. arborescens Chemnitz¹

318. * M. flavia Dunker¹ 319. * Modiolaria argentea Reeve¹

320. * Botula cinnamomea (Lamarck)¹ 321. * Lithophaga teres (Philippi)¹

322. * L. nigra Orbigny¹

76. Family PINNIDAE

323. * Pinna muricata Linnaeus¹ 324. * P. saccata Linnaeus¹

325. * P. serrata Solander¹ 326. * P. cebuensis Reeve⁷

327. * Atrina vexillum (Born)¹

Order PTERIOIDA

77. Family PTERIIIDAE

328. * Margaritifera vulgaris Schumacher⁷ 329. Pinctada fucata (Gould)
78. Family ISOGNOMONIDAE
330. *Malleus anadinus* Gmelin1
331. *Electroma alacorvis* Chemnitz16

78. Family PECTINIDAE
332. *Pecten irregularis* Sowerby1
333. *P. senatorius* Gmelin1
334. *P. maldivensis* Smith1
335. *P. varians* Linnaeus1
336. *Pallium plica* Linnaeus1
337. *Semipecten forbesianus* Adams & Reeve1

80. Family SPONDYLIDAE
338. *Spondylus layardi* Reeve
339. *S. multisetosus* Reeve
340. *S. imperialis* Chemnitz1
341. *S. violacens* Lamarck7

81. Family LIMIDAE
342. *Lima fragilis* Chemnitz1,16
343. *L. inflata* Chemnitz1
344. *L. squamosa* Lamarck1

82. Family OSTREIDAE
345. *Crassostrea rivularis* (Gould)
346. *Crassostrea sp.*
347. *Saccostrea cucullata* (Born)

Order VENEROIDA

83. Family LUCINIDAE
348. *Codakia punctata* (Linnaeus)
349. *Ciena bella* (Conrad)

84. Family CHAMIDAE
350. *Chama (Chama) isotoma* Conrad
351. *C. multisquamosa* Reeve
352. *C. imbricata* Broderip1

85. Family CARDITIDAE
352. *Cardita variegata* (Bruguiere)
353. *C. rufescens* Lamarck7

86. Family CARDIIDAE
355. *Ctenocardia fornicata* (Sowerby)
356. *Cardium leucostoma* Born1,7
357. *C. fragum* Linnaeus7
358. *C. sueziense* Issel16
359. *C. (Laevicardium) australis* Sowerby1,16
360. *C. (L) lobulatum* Deshayes1
87. Family TRIDACNIDAE

361. *Tridacna (Chamotrachea) maxima* (Roeding)

88. Family MACTRIDAE

362. *Mactra luzonica* Deshayes

363. *M. olorina* Philippi

89. Family MESODESMATIDAE

364. *Atactodea glabra* (Gmelin)

90. Family CULTELLIDAE

365. *Siliqua grandis* Dunker

91. Family DONACIDAE

366. *Donax faba* Schröeter

92. Family TELLINIDAE

367. *Tellina (Quidnipagus) palatum* Iredale

368. *T (Scutarcopagia) scobianata* Linnaeus

369. *T (Arcopagia) remies* Linnaeus

370. *T (Arcopaginula) inflata* Gmelin

371. *T elegans* Gray

372. *T rastellum* Hanley

373. *T rhomboides* Quoy & Gaimard

374. *T robusta* Born

375. *T rugosa* Born

376. *T verrucosa* Hanley

377. *T virgata* Linnaeus

378. *Macoma (Scissulina) reticulata* (Sowerby)

93. Family PSAMMOBIIDAE

379. *Psammobia rugulosa* Adams & Reeve

380. *Asaphis deflorata* Linnaeus

381. *A. violascens* (Förskal)

94. Family TRAPEZIIDAE

382. *Cypraeocardia guinianca* Lamarck

95. Family VENERIDAE

383. *Gafrarium pectinatum* (Linnaeus)

384. *Marcia pinguis* (Schröeter)

385. *Timoclea scabra* (Haney)

386. *Venus reticulata* Linnaeus

387. *V. marica* Linnaeus

388. *V. toreuma* Gould
389. *Pitaria obliquata* Hanley
390. *Lioconcha picta* Lamarck
391. *Circe scripta* Linnaeus

96. Family PETRICOLIDAE

392. *Petricola lapicida* Chemnitz

97. Family TEREDINIDAE
(All literature records by N.B.N. & K.D)

393. *Teredothyra excavata* (Jeffreys)
394. *T. smithi* (Bartsch)
395. *Teredora palauenensis* (Edmondson)
396. *T. princesae* (Sivickis)
397. *Uperotus clavus* (Gmelin)
398. *U. rehderi* (Nair)
399. *Teredo aegypos* (Moll)
400. *T. clappi* (Bartsch)
401. *T. fullerii* (Clapp)
402. *T. furcifera* (Martens)
403. *T. somersi* (Clapp)
404. *T. triangularis* (Edmondson)
405. *Lyrodus massa* (Lamy)
406. *L. pedicellatus* (Quatrefages)
407. *Bankia campanellata* (Moll & Roch)
408. *B. carinata* (Gray)

98. Family PHOLADIDAE

409. *Pholas (Thovana) chiloensis* (Molina)
410. *Martesia (Martesia) fragilis* (Verrill & Bush)
411. *M. (M.) striata* (Linnaeus)

99. Family GASTROCHAENIDAE

412. *Gastrochaena cuneiformis* Spengler
413. *G. impressa* (Deshayes)

100. Family CUSPIDARIIDAE

414. *Cuspidaria elegans* Hinds

Class CEPHALOPODA
Order SEPIOIDEA

101. Family SPIRULIDAE

415. *Spirula spirula* (Linnaeus)

102. Family SEPIIDAE

416. *Sepia rouxi* d’Orbigny
417. *S. arabica* Massy
418. *Sepiella inermis* (Ferussac & d’Orbigny)
Order TEUTHOIDEA
103. Family OMMASTREPHIDAE

419. * Symplectoteuthis oualaniensis (Lesson)\textsuperscript{1}

104. Family ENOPLOTEUTHIDAE

420. * Abralia andamanica Goodrich \textsuperscript{17} 421. * Abraliopsis gilchristi (Robson)\textsuperscript{17}

Order OCTOPODA
105. Family OCTOPODIDAE

422. * Octopus (O) arborescens (Hoyle)\textsuperscript{1} 423. * O. (O.) gardineri (Hoyle)
424. * D. (O.) horridus (d’Orbigny)\textsuperscript{1} 425. * O. marmoratus (Hoyle)

EXPLANATIONS FOR SYMBOLS
\textsuperscript{1} Nagabhushanam A.K. & Chandrasekhara Rao, G. 1972;
\textsuperscript{2} Bertsch, H. & d’Attilio, A. 1980;
\textsuperscript{3} B.P. Halder;
\textsuperscript{4} D.R.K. Sastry;
\textsuperscript{5} Eliot, C. 1906;
\textsuperscript{6} G. Chandrasekhara Rao;
\textsuperscript{7} Hornell, J. 1921;
\textsuperscript{8} Hoyle, W.E. 1906;
\textsuperscript{9} Panicker, K.C.S. 1977-78;
\textsuperscript{10} Sundaram, K.S. 1969;
\textsuperscript{11} Virabhadra Rao, K. \textit{et al.} 1975;
\textsuperscript{12} Melvill, J.C. 1909;
\textsuperscript{13} Nair, N.B., & Dharmaraja, K. 1986;
\textsuperscript{14} Namboodiri, P.N. & Sivadas, P. 1980;
\textsuperscript{15} Sakthivel, M. 1974;
\textsuperscript{16} Smith, E.A. 1903, 1906;

ABBREVIATIONS USED
Coll. : Collector;
Ex./Exs. : Example/Examples;
SYSTEMATIC ACCOUNT

Class POLYPLACOPHORA
Family I CHITONIDAE
Genus 1. Chiton Linnaeus, 1758

1. *Chiton granoradiatus* Leloup


*Measurements*: L. 6.90; W. 3.65

*Remarks*: Specimen has been compared with the 'type' present in National Zoological Collections. It is a juvenile form with partly damaged girdle.

The median area of the intermediate valves have longitudinal ridges, whereas the lateral triangle or area has two radiating rows of granules.

*Distribution*: India: Lakshadweep, Andaman and Nicobar Islands; Waltair, Tuticorin and Bombay.

The species is reported for the first time from these Islands.

Class GASTROPODA
Order ARCHAEOGASTROPODA
Family II TROCHIDAE
Subfamily MARGARITINAE
Genus 2. **Euchelus** Philippi, 1847

*Euchelus atratus* (Gmelin)


**Measurements**: L. 4.55 - 6.12; W. 4.15 - 5.86

**Remarks**: Except for one specimen, which exhibit clear pattern of beaded sculpture, all others are bleached shells.


The species is recorded for the first time from these Islands.

Genus 3. **Tectus** Montfort, 1810

*Tectus pyramis* (Born)


**Measurements**: L. 85.85; W. 81.20

**Remarks**: Shell fairly big in size, encrusted with coral growths and serpulid tubes. Base free from encrustations, olive green in colour, interior nacreous.


The species is recorded for the first time from these Islands.

Subfamily TROCHINAE

Genus 4. **Trochus** Linnaeus, 1758.

Subgenus **Infundibulum** Montfort, 1810

*Infundibulum stellatus* Gmelin


**Measurements**: L. 23.45 - 34.65; W. 30.20 - 35.50

**Remarks**: Most of the shells found encrusted with corals. One of the shell found attached with an epizoic mollusc, *Saptadanta nasika* Prashad & Rao.

This species closely resembles *T. radiatus* but differs from it in having beaded sculpture at its base and slightly convex sides.

The species is recorded for the first time from these Islands.

Family III STOMATELLIDAE
Genus 5. Stomatella Lamarck, 1816
Subgenus Gena Gray, 1850

5. Stomatella (Gena) varia (A. Adams)

1982. Stomatella (Gena) varia: Abbott and Dance, Campendium of Sea shells: 44, fig.


Measurements: L. 9.70; W. 5.85.

Description: Shell auriform, spire depressed, body whorl large, smooth, oblique, anteriorly expanded, posteriorly narrowed; outer surface purple colour, maculated with white, semitriangular spots; interior nacreous; lower part of body whorl with fine spiral grooves; foot very large, cream colour; without operculum.

The snail has a tendency to shed part of its foot when disturbed (Cemohorsky, 1972). A part of the shed foot is present in the tube where the specimen has been preserved. Perhaps the same species is reported under the names S. auriculata by Smith (1906) and Gena auricula by Melvill (1909) from Maldives and Minicoy respectively.


Family IV TURBINIDAE
Genus 6. Turbo Linnaeus, 1758
Subgenus Marmarostoma Swaison, 1829

6. Turbo (Marmarostoma) argyrocostus Linnaeus

1758. Turbo argyrocostus Linnaeus, Syst. Nat., ed. 10: 764, sp. no. 544 (Type locality: 'M. Indico').


Measurements: L. 10.90 - 65.85; W. 9.80 - 59.05.

Remarks: Usually found under boulders and stones among coral reefs. This species can be distinguished by its angular body whorl bearing scabrous spiral cords and a row of spines on its shoulder as well on its lower part. However angulation is not seen in juveniles. Ground colour is white with chocolate brown streaks and green blotches on spiral cords.
One of the shells is found with an epizoic animal *Saptadanta nasika* Prashad and Rao near its columellar region. It has been recorded earlier from Minicoy (Smith 1906; Melvill, 1909 and Hornell, 1921).


**Genus 7. Astraea Roeding, 1798**

**Subgenus Astrelium Link, 1807**


**Measurements**: L. 22.00 - 24.36; W. 26.60 - 28.40

**Remarks**: It is commonly found in the crevices of rocks, boulders and coral reefs. It can be recognised by its conical shape and short nodules along the periphery of the shell, sculptured with oblique axial ribs on the whorls; shell non umbilicate.

Shells found inhabited with hermit crabs, *Coenobita perlatus* Milne Edwards.

**Distribution**: *India*: Lakshadweep, Gulf of Kutch, Bombay, Kerala, Tamil Nadu. *Elsewhere*: Indian Ocean. The species is recorded for the first time from these Islands.

**Family V Neritidae**

The collection includes six species under two genera.

**Genus 8. Nerita Linnaeus, 1758**

**Subgenus Theliostyla Moerch**


**Measurements**: L. 10.00 - 20.92; W. 10-80 - 26.80

**Remarks**: It occurs in the inter tidal rocks and coral reefs. It can be recognised by the presence of a large number of pustules on its broad columella. It has been reported earlier from Minicoy by Melvill (1909) and Hornell (1921).
**Distribution** : *India* : Lakshadweep; very common on both the coasts of Indian main land and Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in Indo-Pacific region.

**Subgenus** **Amphinerita** von Martens, 1889

9. Nerita *(Amphinerita) polita* Linnaeus


**Measurements** : L. 7.60 - 31.65; W. 9.15 - 22.15

**Remarks** : It can be distinguished by the smoothness of its shell, highly variable colour, from greenish brown to gray, either with bands or maculations; columella yellowish white, glossy, margin with three to six denticles. It has been recorded from Minicoy by Melvill (1909) and Hornell (1921). Subba Rao (1975) studied its ecology. It usually burrows into sand during the high tide.


**Subgenus** **Ritena** Gray, 1858

10. Nerita *(Ritena) plicata* Linnaeus


**Measurements** : L. 8.05-22.42; W. 7.94 - 21.85.

**Remarks** : The shells are recognised by their strong spiral ribs and teeth in the aperture. It closely resembles *N. costata* but differs in being white or gray and in having a prominent spire. Usually inhabits coral reefs and rocky shores in the intertidal region.

11. *Nerita (Ritena) semirugosa* Recluz


**Measurements** : L. 18.26 - 26.65; W. 14.60 - 22.75

**Remarks** : Adequate description has been given by Subba Rao (1975) and Satyamurti (1952). It usually occurs in supralittoral zone in sandy areas among rocks and boulders and occupies highest position in the littoral zone receiving splashes from waves.

It has been recorded under the name *Nerita histrio* from Minicoy (Nagabhushanam and Rao, 1972) and from Krusadai Island (Satyamurti, 1952).


12. *Nerita (Thelisostyla) squamulata* Le Guillou


**Measurements** : L. 25.22; W. 23.45

**Remarks** : It closely resembles *N. chamaeleon* but differs from it in having a depressed spire, scaly spiral cords on the surface, four to six small denticles on the columella. It is often confused with the former species and even treated as synonymous. The shells are found inhabited by hermit crab, *Coenobita perlatus* Milne Edwards.

**Distribution** : India : Lakshadweep, Paradip, Krusadai Island, Andaman and Nicobar Islands. Elsewhere : Moderately common in the tropical Pacific (Cernohorsky, 1972). It is the first record from these Islands.


13. *Pseudonerita amoena* (Gould)


**Measurements** : L. 6.42; W. 6.85

**Description** : Shell ovate, strong, spire depressed, spirally striated with growth lines, mottled white; aperture white, outer lip margin grayish in colour, columella smooth and white, tinged with light yellow; margin with fine teeth; operculum dark gray on its external surface.
**Distribution**: India: Lakshadweep, Andaman and Nicobar Islands. Elsewhere: Mauritius, Seychelles. It is recorded for the first time from these Islands.

Order MESOGASTROPODA  
Family VI LITTORINIDAE  
Genus 10. Littorina Ferrusac, 1822  
Subgenus Littoraria Griffith and Pidgeon, 1834

14. *Littorina (Littoraria) undulata* Gray


**Measurements**: L. 5.55 - 15.50; W. 3.45 - 9-8.90

**Remarks**: It is highly variable. Usually found in the crevices of rocks and boulders in the intertidal zone.


Genus 11 Peasiella Nevill, 1884

The genus includes a single species from these Islands. Nevill (1884) described this as subgenus under the genus, *Risella* with *Risella tantillus* Gould as type species. Thiele (1931) elevated it to the genus.

15. *Peasiella tantilla* (Gould)

(Plate I, Figs. 3 & 4)


**Material**: Lakshadweep: 8 exs., Coll. no. data.

**Measurements**: L. 2.28 - 3.05; W. 142 - 3.25

**Description**: Shell small, not exceeding 4 mm, trochiform, spire consists of four whorls, sides slightly rounded, sloping; body whorl large, base flattened; umbilicate, aperture squarose, columella smooth, whorls sculptured with nodulose spiral ribs, eight on body whorl, four in spiral whorls, suture distinct, base with strong and distant spiral ridges; lower part of body whorl often with oblique axial ribs. Based on this difference, Nevill (1884) created a variety, and named it as *indica*. However, after comparing the
specimens with that of the typical form, *tantillus* Gould from Sandwich Island, we found that there is no need to treat it as a distinct variety.

**Distribution**: *India*: Lakshadweep only. *Elsewhere*: Sandwich Islands. It is the first record of this species from Indian waters.

**Family VII** **THIARIDAE**

**Genus 12** **Thiara** Roeding, 1798

**Subgenus Melanoides** Oliver, 1807

16. **Thiara (Melanoides) tuberculata** (Mueller)


**Measurements**: L. 11.32 - 28.75; W. 3.95 - 9.84

**Remarks**: It is a highly variable species.

**Distribution**: *India*: Lakshadweep: Throughout peninsular India except Kashmir. This species is found in all the Islands (Hornell, 1921). *Elsewhere*: Maldives, S.E. Asia, Australia and Pacific Islands.

**Family VIII** **PLANAXIDAE**

**Genus 13** **Planaxis** Lamarck, 1822

**Subgenus Planaxis s. str.**

17. **Planaxis (Planaxis) sulcatus** (Born)

1780. *Buccinum sulcatum* Born, *Testacea Musei Caesarei Vindobonensis*: 258, pl. 10, figs. 3,6 (Type locality: Not known).


**Measurements**: L. 2.30 - 11.15; W. 1.80 - 6.98

**Remarks**: Animals inhabit crevices of rocks and boulders in the supra littoral zone along with littorinids. The material includes several juvenile forms.

Genus 14  
**Angiola** Dall, 1926

18. *Angiola lineata* (da Costa)

(Plate I, figs. 1&2)

1778. *Buccinum lineatum* da Costa, British Conchology: 130 (Type locality: West Indies).


*Measurements*: L. 3.25 - 8.40; W. 1.72 - 4.00.

*Description*: Shell small, not exceeding 10 mm. in height, glossy, thick, conically ovate, sculptured with fine striae and distinct orange - coloured spiral bands; aperture ovate, interior lirate; columella concave and smooth, with short, wide anterior canal.

*Remarks*: It has variable colouration and hence received different names (Cernohorsky, 1972). It is an active crawler when submerged in tidal waters and gather together into large aggregations under stones and in the interstices of gravel where it remains moist till next tide. Usually inhabits shallow waters in lagoons and bays in littoral region. Houbrick (1987) studied its anatomy in detail.

*Distribution*: India: Lakshadweep only. Elsewhere: West Indies (Type locality); widely distributed in tropical Pacific and Polynesia (Cernohorsky, 1972). It is recorded for the first times from Indian waters.

Family IX  
**MODULIDAE**

Shell resembles that of turban shell of the family Turbinidae, but differs from it in having depressed spire and angulate body whorl. Only one species is recorded from these Islands.

Genus 15.  
**Modulus** Potiez & Michaud, 1838

19. *Modulus tectum* (Gmelin)


*Measurements*: L. 10.52 - 11.50; W. 12.05 - 13.90

*Remarks*: It can be distinguished by the presence of a strong tooth on the lower part of the columella. Shell porcellaneous, white with brown markings. Found among corals.

*Distribution*: India: Lakshadweep, Andaman Islands. Elsewhere: Maldives. Moderately common in weedy sand areas throughout tropical Pacific (Cernohorsky, 1972). This species has been recorded by Nagabhushanam and Rao (1972) from Minicoy.
Family X  POTAMIDIDAE
Genus 16  Terebralia Swainson, 1840

20. Terebralia palustris (Linnaeus)

1767. Strombus palustris Linnaeus, Syst. Nat., ed. 12 : 1213. (Type locality: "India").
1972. Terebralia palustris : Cerhmohorsky, Marine shells of the Pacific, 2 : 61, pl. 13, fig. 5.


Family XI  CERITHIIDAE

The material includes four species under three genera viz. Cerithium, Clypeomorus and Rhinoclavis.

Genus 17.  Cerithium Bruguiere, 1789

21. Cerithium columna  Sowerby

1834. Cerithium columna Sowerby, Genera of Recent and Fossil shells : pt. 42, pl. 213, fig. 7 (Type locality: not given).


Remarks : It is common on rocky beaches and in coral reefs.


22. Cerithium nodulosum  Bruguiere

1792. Cerithium nodulosum Bruguiere, Encyclopedie Methodique Paris., 1 (2): 478, sp.8, (Type locality: Not given)


Measurements : L. 32.70; W. 15.20

Remarks : Animals usually found on reef flats or sand bars (Cemohorsky, 1972). Anatomy, reproduction and early development have been studied by Houbrick (1971).

Genus 18  

**Clypeomorus** Jousseaume, 1888

23. **Clypeomorus batillariaeformis** Habe and Kosuge

1841. *Cerithium moniliferum* 'Dufresne' Kiener, *Iconographic des Coquilles Vivantes ... genera cerite*, pl. 16, fig. 3 (Type locality: l'Ocean Indien) (not *Cerithium moniliferum* Deshayes, 1833, nor Lea, 1843 Nomen dubium).


**Measurements**: L. 10.85 - 18.15; W. 5.22 - 7.85; H.A. 4.18 - 6.45

**Remarks**: Specimens although juveniles agree with the description and figures given by Houbrick (1985). Specimens from Minicoy are fairly large in size and white in colour with dark chocolate brown tubercles and spiral cords. One of the shells is found encrusted with serpulid tubes.

**Distribution**: India: Lakshadweep, Bombay, Pamban, Rameswaram, Mandapam, Waltair, Andamans. Elsewhere: East Africa, Australia, Pacific Islands. It is recorded for the first time from these Islands.

24. **Clypeomorus traillii** Sowerby


**Material**: Lakshadweep; 1 ex., Coll. no data.

**Measurements**: L. 40.20; W. 17.00; L.S. 27.30

**Remarks**: Shell fairly large in size, whorls with beaded spiral cords, chocolate brown in colour, encircled by striae on either side of suture; aperture white, canal short, oblique, outer lip expanded, lirate inside. It differs from *C. batillariaeformis* in having equal size beads on all spiral striae, whorl not angulate in middle.

**Distribution**: India: Lakshadweep, Hare Island in Gulf of Mannar, Palk Bay, Pamban, Tuticorin. Elsewhere: Singapore, Indonesia, Philippines. It is recorded for the first time from these Islands.

Genus 19. **Rhinoclavis** Swainson, 1840

Subgenus **Rhinoclavis** s. str.

25. **Rhinoclavis** (*Rhinoclavis*) *sinensis* (Gmelin)

1791. *Murex sinensis* Gmelin, *Syst. Nat.*, ed. 13 (1) : 3542, sp. 54 (Type locality: "In mari Senegaliam allunate").


Measurements: L. 14.16 - 23.20; W. 7.04 - 10.56.

Remarks: It occurs in sandy areas in coral reefs. The specimens are white in colour with light brown maculations. Some of them are juvenile. The shell from Kadmat is narrower than the rest.


Family XII TRIPHORIDAE

The family includes small minute sinistral shells usually sculptured with beaded ridges. Two species are included here.

Genus 20. Tripboris Blainville, 1828

Two species are recorded from these Islands.

26. Triphoris elegans Hinds


Measurements: L. 6.30; W. 1.85

Description: Shell small, not exceeding 7 mm, turreted, spire acuminate, consists of 14 whorls including protoconch, whorls spirally ribbed, one of them prominent and distinctly nodulose followed by two thin ribs; with distinct nodules; aperture oblique, ovately rounded, open right (sinistral), canal short, obliquely turned right; colour white, mottled with chocolate brown markings.

Distribution: India: Lakshadweep. It is the first record from these Islands. Elsewhere: Maldives, Mauritius.

27. Triphoris cingulifera Pease


Measurements: L. 5.20; W. 2.05

Description: Shell small, not exceeding 6 mm, ovately elongate, spire high, acute, consists of more than eight whorls, each whorl sculptured with two spiral rows of tubercles, interspaced with spiral threads; upper row with broad, white nodules and lower row with smaller and reddish-brown nodules; body whorl bears four rows of nodules, of
which upper two white, lower two with alternate reddish brown nodules; aperture small, rounded; canal short, open and turn right side.

**Remarks** : This species can be distinguished from *T. elegans* in having two rows of tubercles; and also in possessing coloured tubercles.

**Distribution** : *India* : Lakshadweep. *Elsewhere* : Indo-Pacific. The species is recorded for the first time from these Islands.

### Family XIII EULIMIDAE

The family includes parasitic forms characterised by minute shells and absence of radula.

#### Genus 21. Balcis Leach, 1852

**28. Balcis inflexa** (Pease)

(Plate I, Figs. 5&6)


**Measurements** : L. 7.90; W. 3.30

**Description** : Shell small, turreted, smooth, white; spire high, consists of more than seven whorls, suture distinct, whorls slightly convex, body whorl rounded; aperture ovate, outer lip simple, smooth, inner lip mildly produced ventrally, columella smooth; interior smooth, white.

**Distribution** : *India* : Lakshadweep; Nicobars. *Elsewhere* : Mauritius. It is recorded for the first time from Indian waters.

### Family XIV CYPRAEIDAE

#### Genus 22. Cypraea Linnaeus, 1758

**29. Cypraea tigris** Linnaeus


**Material** : Kalpeni: 1 ex., Coll. Mallik.

**Remarks** : The species can be distinguished from other species by its size, which usually exceeds 50 mm., dorsum elevated, profusely ornamented with large rounded blackish-brown spots, of variable size, on white base; basal surface concavely depressed; aperture anteriorly dialated.

The shell is frequently used as an ornamental piece. These are sold in the market, particularly in south India, by engraving names, pictures on its dorsum. The species occurs in the sandy beds among shallow water coral reefs.

**Distribution** : *India* - Lakshadweep, Krusadai Island, Pamban in Gulf of Mannar.
Andaman and Nicobar Islands. Elsewhere: Indo-Pacific. The species has been recorded from Minicoy by Hornell (1921) and Nagabhushanam and Rao (1972).

Genus 23  **Erosaria** Troschel, 1863

30. **Erosaria caputserpentis** (Linnaeus)


**Measurements**: L. 28.55 - 40.05; W. 22.55 - 25.75

**Remarks**: The species can be distinguished by its glossy chocolate brown colour which extends on major part of the dorsum, leaving median part with white specks. Ventral part white including teeth. The species has been recorded earlier from these Islands by Hornell (1921), Nagabhushanam and Rao (1972) and Mallik (1979). The last mentioned records from Kalpeni and Cheriyam as *E. caputserpents reticulum* (Gmelin) may probably belong to the present species.


31. **Erosaria erosa** (Linnaeus)


**Measurements**: L. 31.70 - 32.30; W. 18.82 - 21.05

**Remarks**: Shell fawn to light brown in colour, decorated with small rounded white specks, sides with rectangular dark brown blotches, teeth occasionally streaked with brown. Hornell (1921) recorded this species from Minicoy. The species can be distinguished from *E. caputserpentis* in its shell feature by its sides rounded; brown or brownish green dorsum, angulate and thickened shell with rectangular dark blotch in the sides; teeth occasionally streaked with brown where as it is white in *caputserpentis*.

Genus 24  **Erronea** Troschel, 1863

32. *Erronea listeri* (Gray)


*Measurements*: L. 15.32 - 17.80; W. 8.30 - 9.45

*Remarks*: Shell small agreeing with the description and figure given by Cemohorsky (1967). Abbott and Dance (1982) referred this species to *Cypraea felina* Gmelin.

*Distribution*: **India** - Lakshadweep, Bombay, Andaman and Nicobar Islands. **Elsewhere**: Maldives to Ploynesia.

Genus 25. **Luria** Jousseaume, 1884

33. *Luria isabella* (Linnaeus)


*Remarks*: Shell cylindrical, recognised by having its dorsum either fawn or gray colour, crossed by transverse bands and fine longitudinal interrupted black lines, both anterior and posterior ends with orange blotches, base white.

This species inhabits coral reefs in shallow waters.

*Distribution*: **India** - Lakshadweep, Pamban, Rameswaran in Gulf of Mannar, Andaman and Nicobar Islands. **Elsewhere**: Widely distributed in Indo-Pacific region.

Genus 26. **Lyncina** Troschel, 1863

34. *Lyncina argus* (Linnaeus)

1758. *Cypraea argus* Linnaeus, *Syst. Nat.*, ed. 10 : 719, sp. 287 (Type locality: '0. Africae').


*Remarks*: This species can be recognised by its elongate and smooth, shell with fawn-yellow coloured dorsum, conspicuously marked with small and large chocolate brown rings, rings occasionally irregular; base ornamented with four large dark brown spots, teeth brown colour. It inhabits coral reefs and is commonly known as 'Eyed Cowry'.

*Distribution*: **India** - Lakshadweep, Andaman and Nicobar Islands. **Elsewhere**:
Throughout Indo-Pacific to northern Australia, Great Barrier Reef. This species has been recorded from Minicoy by Nagabhushanam and Rao (1972).

35. **Lyncina carneola** (Linnaeus)

1906 *Cypraea carneola* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 611.


**Measurements**: L. 33.24 - 33.95; W. 21.05 - 21.25

**Remarks**: This species can be distinguished by its reddish brown shell with four transverse bands, cream coloured base; teeth fine, interstices of purple colour. This species has been recorded by Smith (1906) from Minicoy.

**Distribution**: **India** - Lakshadweep, Andaman and Nicobar Islands. **Elsewhere**: Indo-Pacific. Red Sea to Polynesia and Hawaiian Islands.

36. **Lyncina lynx** (Linnaeus)


**Measurements**: L. 41.90; W. 23.38

**Remarks**: This species can be distinguished from the preceding species by the absence of transverse bands on its dorsal surface but covered by dark brown spots on creamish yellow background, dark chocolate brown blotches both on anterior and posterior extremes, interstices of orange brown colour.


37. **Lyncina vitellus** (Linnaeus)


**Measurements**: L. 49.28 - 70.92; W. 31.76 - 42.50

**Description**: Shell ovate to pyriform, dorsum fawn coloured, mottled with white spots of varying size and two to three faint bands across; sides rounded, finely striate; base white or pale; teeth white.
**Remarks**: This species differs from the preceding two by its globular nature and presence of fine striations on its sides and dorsum with white spots.

**Distribution**: India - Lakshadweep, Gulf of Mannar, Hare Island. Andaman and Nicobar Islands.

Genus 27. **Mauritia** Troschel, 1863

The genus includes three species from these Islands. These are recognised by the ornamentation of net work like pattern on the dorsum.

38. **Mauritia arabica** (Linnaeus)

1758. *Cypraea arabica* Linnaeus, *Syst. Nat.*, ed. 10 : 718, no. 286 (Type locality: "India Orientali, ad Fertum Sunda").


**Remarks**: Ornamentation on dorsum varies from reticulate to prominent white specks; interstices of the teeth are orange brown colour. This species is very common in Indian waters.


39. **Mauritia depressa** (Gray)

(Plate I. Figs. 11 & 12)


**Measurements**: L. 31.92 - 38.78; W. 25.60 - 28.00

**Description**: Shell broad, depressed, heavy; dorsum chestnut brown, ornamented with white reticulations, white band at centre extends from anterior to posterior end; ventral part glossy white; sides angulate, spotted; teeth orange brown, short.

**Remarks**: This species closely resembles the preceding one, but differs from it in having tumid and depressed shell. Occurs among rocks and corals in shallow waters.

**Distribution**: India: Lakshadweep only. Elsewhere: Fiji, South Sea Island. From east Africa to Polynesia (Cemohorsky, 1967). The species is recorded for the first time from Indian waters.

40. **Mauritia histrio** (Gmelin)

1791. *Cypraea histrio* Gmelin, *Syst. Nat.*, ed. 13 : 3403, sp. 120 (Type locality: 'Mari Indico').


Remarks: This species can be distinguished in having a distinct blotch on spire, dorsum with large open reticulations, but only trace of longitudinal lines present, base white, teeth chocolate brown; both anterior and posterior ends with dark chocolate brown blotches. This species closely resembles *M. grayana* and *M. arabica* but can be distinguished in having large open reticulations.

Distribution: India: Lakshadweep, Coromandel Coast. Elsewhere: Malaysia to Australia.

41. *Mauritia scurra* (Gmelin)

(Plate I, Figs. 7 & 8)


Measurements: L. 29.00; W. 16.32

Description: Shell cylindrical, slender, dorsum brown, reticulate with white rounded markings; ventral part white, pale orange on margins, sides rounded with brown spots; aperture narrow, teeth fine, chocolate brown colour.

Remarks: This species differs from preceeding two species in having cyr. ·ulrical narrow body and rounded sides. The present material is represented by a single wornout shell.

Distribution: India: Lakshadweep; Indian seas. Elsewhere: From East Africa to Polynesia, Hawaii (Cernohorsky, 1967). This is the first record from Indian waters.

Genus 28. *Monetaria* Troschel, 1863

Money cowries are included under the genus. A single species is represented from these Islands.

Subgenus *Monetaria* s. str.

42. *Monetaria (Monetaria) moneta* (Linnaeus)

1758. *Cypraea moneta* Linnaeus, *Syst. nat.*, ed. 10 : 723, sp. 312 (Type locality: "ad African, in M. Mediterraneo").


Measurements: L. 18.05 - 21.25; W. 11.80 - 14.06

Remarks: This species was used as money in ancient days hence called as 'Money cowry'. This species varies in its shape and colour and can be distinguished by its
pentagonal shape. The reports of the species from West Bengal coast (Digha), Orissa (Chandipur, Puri, Konarak) was based on empty shells, but these are not suitable habitats for the species to thrive.


Genus 29. **Talparia** Troschel, 1863

Single species is represented here under this genus.

43. **Talparia talpa** (Linnaeus)


**Measurements**: L. 48.45; W. 25.70

**Remarks**: This species can be distinguished by the presence of four brown bands on yellow or fawn colour dorsum; base as well as sides black in colour including teeth; aperture narrow, interior fawn coloured. Specimens from Maldives are having dark chocolate base. It occurs among coral reefs.


Family XV STROMBIDAE

The family includes true conchs. Usually inhabits warm waters. Animals have a powerful foot, longer eye stalks; operculum corneous with serrated margin. The family includes two genera viz. *Strombus* and *Lambis* from these Islands.

Genus 30. **Strombus** Linnaeus, 1758

Three species are included under this genus.

Subgenus **Gibberulus** Jousseaume, 1888

44. *Strombus* (Gibberulus) *gibberulus* *gibberulus* Linnaeus


**Measurements**: L. 30.10 - 47.12; W. 16.12 - 23.55


Subgenus Canarium Schumacher, 1817

45. *Strombus (Canarium) mutabilis* Swainson


Remarks: Most of the shells are occupied by hermit crabs. Shell white, mottled with light brown to chocolate brown with a white band on the middle of the body; aperture light pink leaving a gap in the middle.


Genus 31. *Lambis* Roeding, 1798

Subgenus Lambis s. str.

46. *Lambis (Lambis) lambis* (Linnaeus)


Material: Between Kalpeni and Cheriyam: 2 exs., Coll. Mallik, T.K.

Remarks: It is a common species on coral reefs in Andaman and Nicobar Islands as well as on mainland particularly in the Gulf of Mannar and Palk Bay. These attain a size of 280 mm (Subba Rao, 1982). This species has been recorded from Minicoy by Hornell (1921), and Nagabhushanan and Rao (1972) and from Cheryam Island by Mallik (1979).


Subgenus Harpago Moerch, 1852

47. *Lambis (Harpago) chiragra chiragra* (Linnaeus)

1758. *Strombus chiragra* Linnaeus, Syst. Nat., ed. 10 : 742, sp. 423 (Type locality: 'Ad Bandan Asiae').


*Measurements*: L. 130.45 - 217.00; W. 82.56 - 154.00

*Remarks*: Though the material agrees with the description given by Abbott (1961) the shell does not have any digitate processes, aperture narrowly elongate with constriction at posterior region, white, enamelled, outer lip with extension, impression of outer sculpture seen inside; columella smooth. Shell covered with periostracum. Another shell fairly large in size, encrusted with coral growth; surface with numerous holes made by borers. Epizoic forms like, *Saptadanta nasika* found attached towards columella at its upper part. Aperture dark violet towards periphery, gradually white towards interior.


Family XVI VANI KORIDAE

Genus 32. *Vanikoro* Quoy and Gaimard, 1833

48. *Vanikoro cancellata* (Lamarck)


*Measurements*: L. 17.40 - 23.05; W. 11.85 - 26.10


Family XVII HIPPONICIDAE

Genus 33. *Saptadanta* Prashad and Rao, 1934

The genus *Saptadanta* described from Andamans with *S. nasika* as type species, has its distribution in Indian waters. The genus includes only one species. Animals of this genus are found attached to other gastropods as epifauna.

49. *Saptadanta nasika* Prashad and Rao


*Material*: Kadmat: 15 exs., Coll. B.P.H., 4-11.4.1984 (on *Conus coronatus*;
State Fauna Series 2: Fauna of Lakshadweep


Measurements: L. 8.05 - 11.15; W. 7.70 - 10.75; Ht. 4.28-5.05

Remarks: Animals made deep cavities on the host specimens. Rajagopal (1977) recorded this species on Turbo spinosus, T. brunneus and Cerithium columna in addition to Trochus niloticus, Pterocera lambis (= Lambis lambis L.) and P. chiragra (= Lambis chiragra) reported by Prashad and Rao (1934) and Rao (1961). Prashad and Rao (1934) and Rao (1937) have discussed the diminishing value of Trochus niloticus due to the presence of this species. Heavy infestation of this species on shells lowers their commercial value.

Distribution: India: Lakshadweep and Andaman and Nicobar Islands, Tuticorin, Mangalore.

Family XVIII NATICIDAE

Genus 34. Natica Scopoli, 1777

Subgenus Natica s. str.

50. Natica (Natica) guallieriana Recluz


Measurements: L. 14.70 - 16.21; W. 13.05 - 13.48

Remarks: This species is very common on Indian coasts in shallow waters near the river mouths, and has been recorded under the name Natica marochiensis (Mookherjee, 1985). Cernohorsky (1971) studied its validity and assigned Indo-Pacific species to N. guallieriana; N. marochiensis Gmelin is restricted to Caribbean waters. 'No naticid species has had a more confused taxonomic history than the common Indo-Pacific Natica guallieriana' (Cernohorsky, 1971).

This species closely agrees with marochiensis but differs in having less globose shell with less elevated spire; nuclear whorls white in colour, columellar edge of operculum and narrow zone adjacent to edge smooth. Where as in marochiensis shell is more globose, spire elevated, nuclear whorls purple in colour, columellar edge of operculum and narrow zone adjacent to edge scabrous.

Distribution: India: Lakshadweep, Gulf of Mannar, Tuticorin, Rameswaram, Madras, Coast of Orissa & West Bengal. Elsewhere: Africa, Sri Lanka, Philippines, Fiji. It is recorded for the first time for these islands.

51. Natica (Natica) vitellus Linnaeus

1758. Natica vitellus Linnaeus, Syst. Nat., ed. 10 : 776, sp. 625 (Type locality: 'O. Asiad').


Remarks: Natica rufa is a synonym of this species. Usually collected in fishing nets. This species inhabits sandy beach near the low tide line and occasionally in weedy places (Mookerjee, 1985). Shells are eroded and lost its original colour.

Distribution: India: Lakshadweep, Bombay, Calicut, Porto Novo, Madras, Kakinada, Visakhapatnam, Mahanadi estuary, Hooghly river mouth. Elsewhere: Mauritius, Karachi, Singapore, Hong Kong. The species is recorded for the first time from these Islands.

Genus 35. Polinices Montfort, 1810

Subgenus Mamilla Schumacher, 1817

52. Polinices (Mamilla) maurus (Lamarck)

(Plate I, Figs. 9 & 10)

1816. Natica mauro Lamarck, Tableau Encyclopédique et Methodique 10: pl. 453, figs. 4a-b, (Type locality: Indian Ocean, Lamarck, 1822).


Measurements: L. 21.55; W. 17.45

Description: Shell light brown, spire white, aperture semiovate, wide, parietal calous dark brown, interior dull.

Remarks: This species closely resembles P. melanostomus but differs in not having brown bands on body whorl, and the parietal calous being dark chocolate brown. This species occurs in weedy coral sand but more commonly found in muddy sand localities in intertidal region (Cernohorsky, 1971).

Distribution: India: Lakshadweep only. Elsewhere: Philippines, Fiji, common and ranges from Central Pacific towards Indian Ocean (Cernohorsky, 1972). This is first record of this species from Indian waters.

53. Polinices (Mamilla) melanostomus (Gmelin)


Measurements: L. 21.40 - 32.85; W. 18.36 - 27.00

Remarks: This species can be distinguished by the presence of dark brown
pariental callous, surface smooth, white with three spiral dark brown bands. This species has been recorded from Minicoy earlier by Hornell (1921) and Nagabhushanam and Rao (1972).


Subgenus **Polinices** s. str.

54. **Polinices (Polinices) tumidus** (Swainson)


**Measurements** : L. 23.58 - 26.60; W. 19.95 - 20.96

**Remarks** : This species can be distinguished by its pyriform shape, porcellaneous white; shell with columella broad, umbilicus filled by callous; shell heavy, with short spire; aperture semicircular, operculum corneous. One of the shells is found with light brown blotches on its body whorl. Both the shells are found inhabited by hermit crabs, *Coenobita rugosus* Milne Edwards. Smith (1906) reported this species from Maldives as *Polinices mamilla* which is a synonym of this species.


Family XIX **CASSIDAE**

Genus 36. **Casmaria** H. and A. Adams, 1853

55. **Casmaria ponderosa ponderosa** (Gmelin)


**Measurements** : L. 33.40; W. 20.20

**Description** : Shell ovate, solid, body whorl sculptured with axial nodules on its shoulder, some times smooth, rest are smooth, aperture moderately wide, outer lip thick with denticles throughout, interior with smaller denticles, columella out side smooth, calloused, interior plicated, canal short, shell white in colour, with rows of rectangular chocolate brown blotches, one at subsutural level, one to two at base of the body whorl; row of brown blotches along varix.
Distribution: India: Lakshadweep, Krusadai Island, Tuticorin, Andaman and Nicobar Islands. Elsewhere: Maldives, Mauritius, Philippines; East Africa to Polynesia (Abbott, 1968). This is the first record from these Islands.

Genus 37. Cypraecassis Stutchbury, 1837

56. Cypraecassis (Cypraecassis) rufa (Linnaeus)


pl. 4, figs. 10-12; pls. 44-46


Measurements: L. 88.90; W. 62.30

Remarks: This species can be recognised by the presence of three to four rows of large blunt knobs decreasing in size towards base, smaller nodules and pitted grooves in between large knobs; columellar callous large, extends sideways, columella lirate and denticulate; reddish brown colour with faint bands on it.

This species inhabits shallow waters in intertidal zone in coarse coral sand and algae near coral reefs (Abbott, 1968). This species has been recorded from Minicoy by Hornell (1921) and Nagabhushanam and Rao (1972). These are often used as trumpets by boys in the Minicoy (Hornell, 1921). It is commonly known as ‘Queen shell’ or ‘Bullmouth shell’


Family XX Tonnidae

Genus 38. Malea Valenciennes in Humboldt, 1832

57. Malea pomum (Linnaeus)


Measurements: L. 56.25; W. 42.10

Remarks: This species has been reported from Minicoy as, Dolium pomum by Hornell (1921). National Zoological Collections include collections labelled as ‘Indian Seas’ which indicates localities Sri Lanka, Maldives, Mauritius etc. This species is moderately common and is widely distributed throughout the tropical pacific; it is the only living species of Malea in the Indo-Pacific (Cernohorsky, 1972).

Family XXI CYMATIIDAE

Genus 39. Charonia Gistel, 1848

58. Charonia tritonis (Linnaeus)


Material: Kalpeni; 1 ex., Coll. Mallik.

Remarks: This species is commonly known as ‘Trumpet Shell’ Shell large, heavy, trumpet shaped, cream coloured, ornamented with purplish brown blotches and streaks on spiral cords; shell provided with two prominent varices; aperture large ovate, outer lip thick and dentate, inner lip plicate, interstices black. Inhabits shallow waters in coral reefs.


Genus 40. Cymatium Roeding, 1798

59. Cymatium parthenopeum (von Salis)

(Plate II, Figs. 15 & 16)

1972. Cymatium (Monoplex) parthenopeum: Cernohorsky, Marine shells of the Pacific, 2 : 116, pl. 1, fig. 4,


Measurements: L. 23.05; W. 11.40; L.A. 10.34; L.S. 11.25; L.C. 4.05.

Description: Shell spindle shape, spire elevated, tip acute, consists of eight whors including protoconch, body whorl large, rounded, suture distinct, sculptured with prominent spiral cords and axial ribs more prominent on spiral whors and gradually obsolete on body whorl in between spiral threads, aperture ovate, continuous into short narrow canal; outer lip thickened to form a varix, interior with faint paired teeth; columella plicated, shells white in colour but covered with light brown periostracum.

Remarks: The present material is a juvenile form but agrees with the characters given by Cernohorsky (1972).

Distribution: India: Lakshadweep only. Elsewhere: Widely distributed from New Zealand to East Australia, Japan, East Africa, Mediterranean, Florida, Brazil (Cernohorsky, 1972). All tropical and warm seas (Abbott and Dance, 1982). This is the first record from Indian waters.

60. Cymatium pileare Linnaeus,

1758. Murex pileare Linnaeus, Syst. Nat., ed. 10 : 749, sp. 458 (Type locality: 'M. Mediterraneo').


**Measurements**: L. 22.48 - 24.50; W. 11.20 - 13.04

**Remarks**: Shells juvenile, white in colour and without periostracum, agree with description and figures given by Cernohorsky (1967) except in size.


61. *Cymatium nicobaricum* (Roeding)


**Measurements**: L. 15.85 - 40.05; W. 8.70 - 23.70

**Remarks**: Shell agrees with the description and figures given by earlier workers but smaller in size, juvenile, partly covered by coral encrustations. One of the shells is found inhabited by hermit crab, *Calcinus herbstii* De Man.


62. *Cymatium (Ranularia) sinense* (Reeve)

(Plate II. Figs. 13 & 14)

1844. *Triton sinensis* Reeve, *Proc. zool. Soc. Lond* (1844); *Conch. Icon.*, 2; *Triton*, sp. 18, pl. 6, fig. 18a-b. (Type locality: China).


**Material**: Kavaratti: 1 ex., Coll. B.P.H., 27.3.1984.

**Measurements**: *L 32.80; W. 22.10 (* spire broken).

**Description**: Shell moderately large, triangular, spire elevated, whorls angular, sculptured with spiral cords, axial sculpture with mild ribs, intersection with cords, nodulose, prominent knobs on shoulder; each whorl with two varices; outer lip dentate, columella plicate, siphonal canal long, slender, mildly recurved; colour white, occasionally flecked with orange or yellow, interior of aperture and canal white.

**Remarks**: Material closely agrees with the figure and description given by Cernohorsky (1972), columella with two chocolate coloured spots on posterior part as well as on varices.

**Distribution**: *India*: Lakshadweep only. *Elsewhere*: China. Rare in the western
Pacific (Cernohorsky, 1972). This species is recorded for the first time from Indian waters.

63. *Cymatium vespaceum* (Lamarck)


**Measurements**: *L. 21.30 - 27.60; W. 12.30 - 15.95. (* spire and canal broken)

**Remarks**: It can be distinguished by its blackish brown colour with white spiral bands, one on each whorl; spire slightly recurved, sculptured with spiral ridges bisected by axial ribs; shoulder region well angulated by prominent tubercles.

The present material slightly damaged in its spire and canal. *Triton thersites* Reeve is a synonym of this species.

**Distribution**: India: Lakshadweep, Tuticorin, Galaxea reef, Indian seas. Elsewhere: Persian Gulf, Makaran coast, Mauritius, Sri Lanka, Australia, West Indies. This species is the first record from these Islands.

Family XXII BURSIDAE

Animals of this family are commonly known as 'Frog shells'


64. *Bursa bufonia* (Gmelin)


**Measurements**: L. 55.56 - 63.50; W. 43.02 - 43.40.

**Remarks**: Shells are found heavily encrusted with coral growth. It inhabits coral reefs. This species has not been recorded from the Indian main land but recorded from Minicoy by Hornell (1921).

**Distribution**: India: Lakshadweep, Andaman and Nicobar Islands. Elsewhere: Maldives. This species occurs throughout tropical Indo-Pacific (Abbott and Dance, 1982).

65. *Bursa cruentata* (Sowerby)

(Plate II, Figs. 17 & 18)


**Measurements** : L. 28.18; W. 23.80

**Description** : Shell solid, tumid, spire high, consists of three to four whorls, each whorl carry two varices either side, body whorl large, whorls with three to four large knobs in between varices; sculptured with nodulose spiral cords, interception of cords with varices gives to knobs on it, deep cavities in between cords near varices; shell white and knobs dark brown; aperture white, outer lip thick, expanded, denticles inside, columella plicated, four to five dark chocolate brown markings on it; canal short, open.

**Remarks** : Present material is partly encrusted with coral growth, especially red coral. Animals usually inhabit coral reefs in shallow waters. Shell found inhabited by hermit crab. This species can be easily distinguished by the presence of well defined red spots on inner lip, ornamented.

**Distribution** : India: Lakshadweep only. Elsewhere : Mauritius, south Africa to Polynesia, Hawaiian and Cleppeton Islands. Indo-Pacific. This is the first record of this species from Indian waters.

66. *Bursa granularis* (Roeding)


1967. *Bursa granularis* : Cemohorsky, Marine shells of the Pacific, 1 : 44, pl. 1, fig. 4 (for other synonyms).


**Measurements** : L. 29.67; W. 18.40

**Remarks** : This species can be distinguished from other species in shell laterally compressed, lighter, body whorl with more than ten rows of tuberculated cords, interspaced with spiral striae, tubercles irregular; aperture white or creamy white; canal short, open. This species closely resembles, *Gyrenium natator* but differs from it in the absence of deep posterior canal, outer lip with numerous denticles. Often confused with the former species.

This species inhabits rocky and coral beaches in shallow waters.


Order NEOGASTROPODA

Family XXIII MURICIDAE

Genus 42. Chicoreus Montfort, 1810

67. *Chicoreus crocatus* (Reeve)

(Plate II. Figs. 19 & 20)


**Measurements** : L. 50.24; W. 38.50

**Remarks** : Material agrees with the original description and figure and is the subsequent record after its discovery. National Zoological Collections have a single specimen from the locality labelled as ‘Ceylon’ (Sri Lanka). The present record is the first from the Indian waters and the specimen is larger in size than the one from Sri Lanka.

Shell found inhabited by hermit crab, *Coenobita rugosus* Milne Edwards.

**Distribution** : *India* : Lakshadweep only. It is recorded for the first time from Indian waters. *Elsewhere* : Sri Lanka, West Indies.

**Genus 43. ** *Murex* Linnaeus, 1758

68. *Murex tribulus* Linnaeus


**Measurements** : L. 39.50 - 70.00; W. 25.00 - 52.95

**Remarks** : This species is very common in the Indo-Pacific region, usually caught in the fisherman’s nets. Highly variable in its colouration, sculpture etc. Radwin and d’Attilio (1976) studied the polymorphism of this species.


**Genus 44. ** *Maculotriton* Dall, 1904

69. *Maculotriton serriale* (Deshayes, in Laborde & Linant)


**Measurements** : L. 10.32 - 11.32; W. 4.20 - 5.05

**Remarks** : Material agrees with description and figures given by Cernohorsky (1972). Shell from Kadmat found encrusted with corals and few eipzoic animals like, *Spirorbis* sp.
Distribution: India: Lakshadweep, Pamban (Satyamurti, 1952), Andaman Islands. Elsewhere: Maldives (Smith, 1906) Philippines, Aden, Sandwich Island. Widely distributed species, moderately common in Pacific (Cemohorsky, 1972). This species is recorded for the first time from these islands.

Genus 45. Drupa Roeding, 1798

The genus includes four species under the subgenera Drupa, Ricinella, Drupina, from these Islands.

Subgenus Drupa s. str.

70. Drupa (Drupa) morum morum Roeding

1798. Drupa morum Roeding, Museum Boltenianum: 55 (Type locality: 'East Indies' selected by Emerson and Cemohorsky, 1973.)


Measurements: L. 24.36 - 27.00; W. 23.36 - 24.10

Remarks: Adequate description and distribution have been given by Emerson & Cemohorsky (1973).

This species can be recognised by its deep violet colouration on its aperture. Usually found in coral reefs. Most of the shells collected are encrusted with corals. It has been reported as Sistrum horridum from Maldives by Smith (1906). Drupa horrida is synonym of this species and recorded from Pamban and Shingle islands by Satyamurti (1952).


71. Drupa (Drupa) ricinus ricinus (Linnaeus)

1758. Murex ricinus Linnaeus, Syst. Nat., ed. 10: 750 sp. 464, (Type locality: "O Asiatico").


Measurements: L. 20.16 - 25.90; W. 17.40 - 23.44

Remarks: This species can be distinguished from the former species in having aperture white, some times with faint yellow ring either continuous or broken; spines
longer, tip dark brown in colour. Most of the shells are encrusted by corals, and animals usually inhabit coral reefs. In some of the shells, teeth on outer lip are simple and aperture orange yellow colour on its boundary. One shell attached with Saptadanta nasika.


### 72. *Drupa (Ricinella) clathrata miticula* (Lamarck)


**Measurements**: L. 18.50 - 27.34; W. 15.00 - 20.48

**Remarks**: Subba Rao and Surya Rao (MS) studied the material from Maldives and gave detailed description. The present material represented by two juvenile forms and one adult shell agrees with the collections made at Maldives. Tips of tubercles black.


### 73. *Drupa (Ricinella) rubusidaeus* Roeding


**Material**: Kavaratti: 1 ex., Coll. B.P.H., 1.1.1980.

**Measurements**: L. 32.55; W. 31.00

**Remarks**: Material agrees with the description and figures given by Emerson and Cernohorsky (1973). Shell found with an impression of cavity mad by hipponicid, *Saptadanta nasika* on its outer margin.


### Subgenus Drupina Dall, 1923

#### 74. *Drupa (Drupina) lobata* (Blainville)


**Measurements**: L. 22.05 - 25.14; W. 21.02 - 23.65

**Remarks**: Subba Rao and Surya Rao (MS) have studied the material from Andaman and Nicobar Islands. The present material agrees with the earlier collections. Shells are encrusted with corals.


Genus 46. *Cronia* H. & A. Adams, 1853

Subgenus  *Ergalatax* Iredale, 1931

75. *Cronia (Ergalatax) contracta* (Reeve)


**Measurements**: L. 23.24 - 26.55; W. 11.74 - 14.15

**Remarks**: Shell sculptured with more than ten axial ribs on body whorl, colour light brown, teeth on outer lip not developed, canal wide and short, inner lip feebly plicated, aperture light purple in colour.

This species is highly variable in its sculpture, colouration and hence reported under several names. We have studied large number of collections made from other localities in India.


Genus 47. *Drupella* Thiele, 1925

76. *Drupella cornus* (Roeding)


Measurements: L. 24.35 - 35.42; W. 14.00 - 22.10

Remarks: Detailed description of this species was given by Subba Rao and Surya Rao (MS) and Cernohorsky (1972) discussed its ecology. Usually found on coral reefs. This species is variable in its sculpture. Some of the shells are encrusted with corals.


Genus 48. Morula Schumacher, 1817

77. Morula anaxares (Kiener)

1835. Purpura anaxares Kiener, (Duclos MSS) Icon. Con. Viv., 8 : 26, pl. 7, fig. 17 (Type locality: Not given).


Measurements: L. 9.74 - 17.18; W. 6.45 - 12.80

Remarks: Shells of this species can be distinguished by the presence of four rows of nodules on body whorls, first two rows being large, giving angular appearance, rest gradually decreasing in size, nodules white on gray background, aperture violet.


78. Morula granulata (Duclos)

1972. Morula granulata: Cernohorsky, Marine shells of the Pacific, 2 : 127, pl. 36. fig. 2.


Measurements: L. 12.55 - 15.80; W. 8.28 - 10.45

Remarks: Adequate description and distribution of this species was given by earlier workers. A very common species found in the crevices of rocks and corals in shallow littoral zone. This species has been recorded as Thais tuberculata by earlier workers.

Distribution: India: Lakshadweep, Okha, Porbandar, Veraval; Bombay, Goa, Anjadive Island, Suratkal, Trivandram, Kovalam, Pulli Island, Krusadai, Mandapam, Madras, Waltair, Gopalpur, Andaman and Nicobar Islands.
79. Morula uva (Roeding)

1798. Drupa uva Roeding, Museum Bottlenianum : 56, sp. 703, (Type locality : Not given).
1792. Morula uva : Cernohorsky, Marine shells of the Pacific, 2 : 127, pl. 36, fig. 3.


Measurements : L. 12.60 - 15.00; W. 13.10 - 13.15

Remarks : Subba Rao and Surya Rao (MS) studied this species in detail and recorded for the first time from Indian waters. This species closely agrees with M granulata, but differs in having spinose nodules; first row of denticles on outer lip being more prominent and later decreasing in size; aperture purplish and nodules black in colour, spire slightly depressed.


Genus 49. Purpura Bruguiere, 1798

80. Purpura panama (Roeding)

1798. Thais panama Roeding, Museum Bottlenianum : 54 (Refers Chemintz, 1794, Conch. Cab, 10, pl. 54, figs. 1467, 1468 (Type locality : Tranquebar).


Measurements : L. 20.80 - 47.10; W. 13.70 - 30.35

Remarks : This species is very common in the rocky coasts of Indian mainland and also recorded from Nicobars. Adequate description of this species has been given by earlier workers under the name Thais rudolphi which is a synonym of the present species.

Distribution : India : Lakshadweep; coasts of Gujarat, Diu, Maharastra, Karnataka, Tamil Nadu, Andhra Pradesh and Nicobars. Elsewhere : Karachi, Sri Lanka, Philippines. It is recorded for the first time from these Islands.

Genus 50. Thais Roeding, 1798

81. Thais armigera (Link)

1807. Purpura armigera : Link, Beschr. natur. Sammlung Univ. Rostock, 8 (refers Chemnitz, 1796 Conch. Cab. 11, pl. 117, figs. 1798).
1967. Thais armigera : Cernohorsky, Marine shells of the Pacific, 1 : 130, pl. 28, fig. 170.


Measurements : L. 45.36; W. 36.75

Remarks : The shell is very heavy and resembles T tuberosa in general, but differs in having high spire, first row of tubercles prominent, long on its body. Inner margin of
outer lip with denticles and without brown blotches on apertural area. Shell found inhabited by hermit crab, *Calcinus herbstii* de Man, also found impressions of epizoic animals like *Saptadanta nasika* and holes made by other borers.

**Distribution**: India: Lakshadweep, Andaman and Nicobar Islands. Elsewhere: Maldives, Mauritius and Philippines. This is the first record of this species from these Islands.

### 82. *Thais hippocastanum* (Linnaeus)


**Measurements**: L. 48.90 - 62.12; W. 36.82 - 36.70

**Remarks**: This species is highly variable in its shape and sculpture. Specimens collected earlier are decollated and partly eroded; some of the collections found with spinose tubercles, particularly upper two rows are distant and gradually decrease in its size, spiral threads in between; shells with brown markings; aperture white and outer lip margin with four lirations, dark chocolate brown.

One of the shell found inhabited by hermit crab, *Coenobita perlatus* Milne Edwards.


### 83. *Thais intermedia* (Kiener)


**Measurements**: L. 45.15; W. 35.00

**Remarks**: Shells covered with heavy encrustations of corals and others except in the apertural area. This indicates that the species inhabit in coral reef. The encrustations include epifauna like *Saptadanta nasika*. Shell has holes made by borers.

**Distribution**: India: Lakshadweep, Pamban, Madras and Andaman and Nicobar Islands. Elsewhere: Maldives, Burma. Throughout tropical Indo-Pacific (Cemohorsky, 1967). This is the first record from these Islands.
84. *Thais tuberosa* (Roeding)


**Measurements** : L. 36.50 - 47.50; W. 28.52 - 32.38


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Genus 51. *Rapana* Schumacher, 1817

85. *Rapana rapiformis* (Born)


**Measurements** : L. 12.92; W. 7.10

**Remarks** : This species has been reported as *Rapana bulbosa*. Usually caught in fishermen's nets. The present shell is a juvenile form, but exhibits distinct characters of the species i.e. body whorl with rows of hollow spinose tubercles, one at shoulder, another on middle and lower part with two rows, columella and purple canal.

**Distribution** : India : Lakshadweep, Gujarat, Tamil Nadu, Pondicherry, Orissa, Andhra Pradesh, Andaman and Nicobars. Elsewhere : South east Asia, from Aden to Philippines.

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Family XXIV CORALLIOPHILIDAE

Genus 52. *Coralliopbila* H. & A. Adams, 1853

86. *Coralliophila neritoidea* (Lamarck)


Measurements: L. 13.08 - 24.35; W. 11.06 - 19.25

Remarks: Shell small, not exceeding 20 mm, globose, spire less elevated, sculptured with scabrous spiral striae, but usually concealed by coral growth; aperture lirate, columella calloused at base, bordered by narrow umbilical channel, dark violet in colour.


Family XXV PYRENIDAE

Genus 53. Pyrene Roeding, 1798

Subgenus Columbella Lamarck, 1799

87. Pyrene (Columbella) varians (Sowerby)


Measurements: L. 6.70 - 9.35; W. 4.30 - 4.65

Remarks: The material studied agrees with the description and figures given by Cernohorsky (1972). Shell white in colour, aperture light violet, outer lip with seven denticles, columella with six denticles on outer margin and with split tooth inside; spiral whorls axially ribbed, body whorls with axial nodes at its shoulder, extends middle of body; spiral cords prominent.

It usually inhabits coral reefs. One of the shells is found encrusted with corals and serpulid colonies. Another shell collected from Minicoy has feebly developed denticles on its outer lip and wavy markings on its body whorl.


88. Pyrene (Columbella) turturina Lamarck

1972. Pyrene (Columbella) turturina: Cernohorsky, Marine shells of the Pacific, 2 : 133, pl. 40, fig. 5.


Measurements: L. 11.20; W. 7.55

Remarks: This species can be distinguished from varians by its bulbous shape, transversely striated whorls, pinkish aperture with two rows of tubercles on columella.

Family XXVI BUCINIDAE

Genus 54. Cantharus Roeding, 1798

89. Cantharus (Pollia) undosus (Linnaeus)

1972. Cantharus (Pollia) undosus: Cemohorsky, Marine shells of the Pacific, 2: 141, pl. 38, fig.5.


Remarks: It is commonly found on rocky shores and in coral reefs. It can be distinguished by its strong and closely arranged spiral ribs, reddish brown colour and white aperture.

Distribution: India: Lakshadweep, Gujarat, Bombay, Gulf of Mannar, Madras, Andamans. Elsewhere: Baluchistan, Mauritius, Sri Lanka, Malayasia, Philippines, Polynesia. It is recorded for the first time from these Islands.

Genus 55. Engina Gray, 1839

90. Engina lineata (Reeve)


Description: Shell small, not exceeding 8 mm. in length, ovate, spindle shaped, spire acuminate, consists of six whorls, axially ribbed, ribs broad, spiral cords numerous; aperture narrow, outer lip thickened, dentate, teeth six in number, columella calloused, plicated throughout; shell white in colour, with deep chocolate to black lines, single on spiral whorls, and body whorl with one on upper part and double in lower part, lines extends to aperture and columella.

Remarks: Shells recorded by Satyamurti (1952) from Pamban under the name of Engina trifasciata seems to belong to the present species.

91. *Engina mendicaria* (Linnaeus)

1758. *Voluta mendicaria* Linnaeus, *Syst. nat.*, ed. 10 : 731, sp. 360 (Type locality: "Asia").


**Measurements** : L. 8.90 - 12.91; W. 5.94 - 8.75

**Remarks** : This species can be distinguished from the former by the presence of golden yellow bands on black background of the shell; columella and denticles on outer lip purple, shell stouter and devoid of axial ribs.

Commonly found among corals and rocks in shallow waters.


Family XXVII  NASSARIIDAE

Genus 56. *Nassarius* Dumeril, 1806

**Subgenus** Alectrion Montfort, 1810

92. *Nassarius (Alectrion) papillosus* (Linnaeus)


**Material** : Kavaratti: 1 ex., Coll. B.P.H., 27.3.1984.

**Measurements** : L. 26.40; W. 14.96

**Remarks** : Material agrees with the description and figure given by Cernohorsky (1972). Shell is partly eroded with slightly damaged outerlip. The uneroded spire has a light orange tip.

**Distribution** : India: Lakshadweep, Andaman and Nicobar Islands. Elsewhere : Gulf of Aden, Malagasy, Mauritius, Sri Lanka, Burma, Singapore, Indonesia, Malaysia, Philippines, Japan, Hawaii. Moderately rare and ranges from Polynesia into Indian Ocean (Cernohorsky, 1972). It was earlier recorded from Minicoy by Hornell (1921).

**Subgenus** Niotha H. A. Adams, 1853

93. *Nassarius (Niotha) echinatus* (A. Adams)


Remarks: The species has been dealt in detail by Cernohorsky (1972).


Genus 57. Hebra H. & A. Adams, 1853

94. Hebra horrida (Dunker)


Measurements: L. 14.15 - 15.10; W. 9.65 - 10.84

Remarks: It is similar to N. echinatus but differs from it in shell being more depressed, ovate, body whorl with more number of rows of spinose nodules, columella more calloused, aperture more rounded, outer lip with more denticles continued as lirations. Cernohorsky (1972) gave more details of this species.


Family XXVIII FASCIOLARIIDAE

The family includes three species under the genera, Fasciolaria, Peristernia and Latirus.

Genus 58. Fasciolaria Lamarck, 1799

Subgenus Pleuroloca Fischer, 1884

95. Fasciolaria (Pleuroloca) filamentosus (Roeding)

1798. Fusus filamentosus Roeding, Museum Boltenianum : 118, sp. 1524 (Type locality: Not given).
1972. Fasciolaria (Pleuroloca) filamentosus: Cernohorsky, Marine shells of the Pacific, '2 : 153, pl. 45, fig. 3.


Measurements: L. 121.60; W. 44.56; L. S. 59.34; L. C. 27.30.

Remarks: Shell fairly big in size, tapering on both ends, orange brown colour with row of blunt nodules on shoulder as well as on spiral whorls, in addition, sculpture consists of spiral cords brown colour and minute axial striae, aperture yellowish, lirate, columella with three folds anteriorly, canal moderately long.

Genus 59. **Peristernia** Moerch, 1852

96. **Peristernia nassatula** (Lamarck)


**Measurements** : L. 10.15 - 30.95; W. 5.20 - 14.82

**Remarks** : Shell smaller than that of *Fasciolaria*, sculptured with heavy axial ribs, nodulose at shoulder on last two to three whorls, prominent spiral cords and axial striae; outer lip finely denticulate on its margin, columella calloused and with two to three plicae; canal short. Usually occurs in coral reefs.


Genus 60. **Latirus** Montfort, 1810

Subgenus **Latirolagena** Harris, 1897

97. **Latirus (Latirolagena) smaragdulus** (Linnaeus)


**Measurements** : L. 34.90 - 36.04; W. 24.05 - 24.90

**Remarks** : It can be easily distinguished from the species *L. belcheri* by its globose shaped, shell sculptured with mildly elevated spiral cords and axial growth striae; aperture lirate, outer lip constricted towards canal, minutely denticulate on it margin; parietal wall with a calloused knob, columella with six plicae; colour dark brown with reddish-brown spiral cords, aperture white, denticles dark brown. This species usually found among coral reefs.


98. **Latirus belcheri** (Reeve)

(Plate III. Figs. 21 & 22)

1847. *Turbinella belcheri* Reeve, *Conch. Icon.*, 4; *Turbinella*, sp. 22, pl. 4, fig. 22 (Type locality : Gargajos Garamas, Indian Ocean).

**Material** : Kavaratti: 1 ex., Coll. B.P.H., 1.1.1980.

**Measurement** : L. 39.05; W. 24.28

**Description** : Shell fusiform, solid, spire elevated with nine whorls; sculptured with spiral cords, interstices with fine threads and row of nodules at suture; body whorl with six rows of tubercles, row on shoulder more spinose, gradually obsolete anteriorly; aperture ovate, outer-lip margin dentate, interior lirate; constricted at base; columella with three plications above canal, canal short, open; shell white painted with chocolate brown flames and blotches, interior white, denticles on outer lip brown.

**Remarks** : Cemohorsky (1972) figured radula; median tooth with three cusps, marginals with ten long cusps margined by short cusps. We have one dead shell inhabited by the hermit crab, *Coenobita perlatus* Milne Edwards.

**Distribution** : India: Lakshadweep only. Elsewhere : Indian Ocean, Fijii. This species is moderately uncommon and ranges westwards from Fiji Islands (Cemohorsky, 1972). This is the first record of this species from Indian waters.

99. *Latirus gibbulus* (Gmelin)


**Material** : Kavaratti: 1 ex., Coll. B.P.H., 1.1.1980.

**Measurements** : L. 62.20; W. 32.70

**Remarks** : This species differs from *L. smaragdulus* in having strong, heavy axial knobs and obsolete spiral threads; shell not globose but of spindle shape; outer lip constricted at base; columella smooth but sometimes faintly plicate, siphonal canal twisted; colour tan with dark brown spiral lines in double rows. Present material found inhabited with hermit crab, *Coenobita perlatus* Milne Edwards.

Shell found with two depressions on its body whorl made by epizoic animals, probably *Sapiadanta nasika*.

**Distribution** : India: Lakshadweep, Andamans. Elsewhere : Maldives. It is the first record from these Islands.

Family XXIX  **VASIDAE**

Genus 61.  **Vasum** (Bolten) Roeding, 1798

Subgenus  **Vasum** s. str.

100. *Vasum* (*Vasum*) **ceramicum** (Linnaeus)


Measurements: L. 89.64 - 130.66; W. 66.96 - 72.35; H.S. 42.96 - 46.05

Remarks: It can be recognised by its high spire, columella with three plicae. Commonly found in coral beds, often covered with coral encrustation. The present material is found attached with epizoic, Saptadana nasika Prashad and Rao.


101. Vasum (Vasum) turbinellus (Linnaeus)

1758. Murex turbinellus Linnaeus, Syst. Nat., ed. 10 : 750, sp. 466 (Type locality: “O. Asiatico ad Nussanaan”).


Measurements: L. 54.74 - 55.35; W. 45.65 - 55.64; H.S. 23.35 - 23.32.

Remarks: It differs from the former species in having low spire and columella with four to five unequal plications, occurs in coral reefs.


Family XXX HARPIDAE

Single species has been included here under the genus, Harpa from these Islands.

Genus 62. Harpa Roeding, 1798

102. Harpa amouretta Roeding


Measurements: L. 32.15 - 37.95; W. 19.90 - 22.90

Remarks: It can be recognised from the other species of the genus by its slender form. Shell of ovate shape with numerous chestnut brown lines on ribs and three widely separated blotches on its ventral surface, central one near juncture of columellar and parietal lips the largest, other two at upper end of parietal lip, and basal end of columellar lip being small and some times absent. It has been reported from Maldives as H. minor which is a synonym of this species.

Nagabhushanam and Rao (1972) reported it under the name of H. ventricosa from Minicoy.

Family XXXI  CANCELLARIIDAE
Genus 63.  Cancellaria Lamarck, 1799

103.  Cancellaria  sp.


*Measurements*: L. 12.15; W. 7.82

*Remarks*: The only shell that is available for study is a juvenile one. However the generic characters are easily discernable. The shell is partly broken in the outer lip region and apertural area, and with partly eroded spire. Shell bears faint brown bands on its body whorl which can be also marked on interior of the aperture along with lirations. We tentatively place the shell under *Cancellaria cancellata* (Linnaeus).

Although the genus has Indo-Pacific distribution, so far no species has been recorded either from Maldives or Lakshadweep Islands.

Family XXXII  MARGINELLIDAE
Genus 64.  Marginella Lamarck, 1801

104.  Marginella angustata  Sowerby


*Measurements*: L. 7.85 - 8.10; W. 3.10 - 3.50

*Description*: Shell small, smooth, polished, elongately ovate, spire short, consists of three whorls but in adults it is sunken; posterior part broader than anterior; aperture narrow, elongate, outer lip thickened columella with four well developed plications; colour white, but with faint brownish yellow markings on its posterior part.

*Remarks*: Present material is a juvenile hence spire can be seen. It is a common species on the east coast.

*Distribution*: India: Lakshadweep, Bombay, Tuticorin, Pamban, Krusadai, Madras, Ganjam coast (Orissa), Andamans. Elsewhere: Sri Lanka, Mauritius, Burma. It is the first record of this species from these Islands.

Family XXXIII  MITRIDAE

The family includes ‘Mitre’ shells, usually inhabiting the coral reefs.

Genus 65.  Mitra Lamarck, 1798

Subgenus  Nebularia Swainson, 1840

105.  *Mitra* (*Nebularia*)  *aurantia aurantia* (Gmelin)


**Material**: Kavaratti: 1 ex., Coll. B.P.H., 30.3.1984.

**Measurements**: L. 19.65; W. 9.08

**Remarks**: Cernohorsky (1976) gave detailed description and synonymy. Material agrees with the description and figures given by earlier workers. It is a highly variable species. Present material is having light broad sub-sutural band which agrees with figure given by Cernohorsky (pl. 256, fig. 38, 1976). Shell partly encrusted.

**Distribution**: India: Lakshadweep, Gujarat, Andhra Pradesh, Andaman and Nicobar Islands. Elsewhere: Throughout Indo-Pacific, Gulf of Aden to S.E. Australia and Polynesia (Cernohorsky, 1976). This is the first record of this species from these Islands.

106. *Mitra (Nebularia) chrysalis* Reeve


**Measurements**: L. 9.04 - 14.60; W. 4.85 - 8.48

**Remarks**: It is a common species in the coral reefs of the islands.

**Distribution**: India: Lakshadweep, Andaman and Nicobar Islands. Elsewhere: Maldives, throughout tropical Indo-Pacific. It is the first record of this species from these islands.

107. *Mitra (Nebularia) cucumerina* Lamarck


**Material**: Kavaratti: 2 exs., Coll. B.P.H., 29.3.1984 and 5.4.1984

**Measurements**: L. 10.15 - 12.72; W. 5.90 - 6.24

**Remarks**: Shell juvenile, reddish-brown in colour with faint band on its lower part.

108. *Mitra (Nebularia) tabanula* Lamarck


**Material**: Kavaratti: 1 ex., Coll. B.P.H., 29.3.1984.

**Measurements**: L. 13.45; W. 11.50 H.A. 7.60

**Remarks**: It can be easily distinguished from preceding species under the subgenus *Nebularia* by its yellow spiral ribs on dark reddish brown body and by the absence of band on the middle part of the body whorl.

**Distribution**: *India*: Lakshadweep, Andaman and Nicobar Islands. *Elsewhere*: Cebu, Gulf of Aden to Samoa, Tonga Islands. This species is recorded for the first time from these Islands.

109. *Mitra (Nebularia) turgida* Reeve


**Measurements**: L. 9.50 - 12.50; W. 4.30 - 5.80

**Remarks**: Shells light yellowish brown on lower part and light olive green on spire. One of the shell is attached with an epizoic gastropod, *Saptadanta nasika* Prashad and Rao on its body whorl.

**Distribution**: *India*: Lakshadweep, Andaman and Nicobar Islands. *Elsewhere*: Gulf of Aden to Polynesia and Hawaiian Islands (Cernohorsky, 1976). It is the first record of the species from these islands.

Subgenus *Strigatella* Swainson, 1840

110. *Mitra (Strigatella) acuminata* Swainson

1832. *Mitra acuminata* Swainson, *Zoological Illustrations*, (2) 3, pl. 128, fig. 3.


**Measurements**: L. 15.82 - 24.92; W. 6.10 - 9.50

**Remarks**: Shell yellowish brown with a faint band at the middle of body whorl, spire acuminate and light coloured.

**Distribution**: *India*: Lakshadweep and Andaman and Nicobar Islands only.
Elsewhere: Mauritius to Polynesia and Hawaii Islands, Maldives. It is the first record from these Islands.

111. *Mitra (Strigatella) litterata* Lamarck


**Measurements**: L. 14.80 - 19.30; W. 7.70 - 8.80

**Remarks**: It can be recognised by its oval shape and irregular longitudinal chocolate brown or yellow streaks and blotches on its surface; sculptured with fine transverse striations; spire short, acuminate, usually eroded in adults.


112. *Mitra (Strigatella) pellisserpentis pellisserpentis* Reeve


**Measurements**: L. 18.55 - 30.45; W. 7.50 - 13.16

**Remarks**: Shells recognised by its granular sculpture, acuminate spire; body whorl orange brown or yellowish-brown with light band at the middle; aperture white. It is one of the most variable species and was identified under more than 13 names. It varies from broadly ovate form to slender elongate and granulose obsolete sculpture.

**Distribution**: India: Lakshadweep, Madras, Andaman and Nicobar Islands. Elsewhere: Mauritius to Polynesia. It is recorded for the first time from these Islands.

113. *Mitra (Strigatella) scutulata* (Gmelin)

1791. *Voluta scutulata* Gmelin, *Syst. Nat.*, ed. 13 : 3452 (Refers Chemnitz, 1788, figs. 1428, 1429 (Type locality: Indian Ocean). Type locality designated by Cernohorsky "Borneo-Indonesia".


**Measurements**: L. 20.00; W. 8.56
Remarks: It can be distinguished from other species under the subgenus, *Strigatella* by its chocolate brown colouration interrupted by yellowish striations and white markings on its spire; light brown aperture, smooth outer lip, convex or subangulated anteriorly.

Distribution: India: Lakshadweep, Gujarat, Bombay, Ratnagiri, Goa, Dharwar; Andamans. Elsewhere: Gulf of Aden to India, Polynesia (Cernohorsky, 1976). It is the first record from these Islands.

Family XXXIV CONIDAE

Cones inhabit coral reefs and rocky shores in shallow waters; operculum small, possess poison apparatus; carnivorous. The material from the islands is identified under ten species.

Genus 66. *Conus* Linnaeus, 1758

114. *Conus aulicus* Linnaeus 1758


Remarks: It can be distinguished by its elongated cylindrical shape, chestnut colour base with white triangular markings of different size and elevated spire. It resembles *C. pennaceus* Born, but differs in the absence of black vertical lines on its surface.


115. *Conus canonicus* Hwass in Bruguiere

1792. *Conus canonicus* Hwass in Bruguiere, Encyclopede Methodique Vers, 1 (2) : 749, pl. 18, fig. 2 (Type locality: East Indian seas).


Measurements: L. 32.48; W. 14.48

Remarks: It resembles, *Conus textile* but differs from it in its narrow shaped shell as well as narrow aperture.


116. *Conus coronatus* Gmelin


Measurements: L. 8.34 - 46.44; W. 4.90 - 28.68

Remarks: One of the shell is encrusted with an epizoic mollusc *Saptadanta nasika* on its spire.


117. *Conus ebraeus* Linnaeus


Measurements: L. 18.14 - 29.10; W. 11.45 - 20.15

Remarks: It is recognised by the presence of three or four rows of blackish brown trapezoidal blotches on its body. Most of the shells white, but few light yellow, partly covered by coral encrustations.


118. *Conus emaciatus* Reeve


Measurements: L. 15.65 - 18.18; W. 9.45 - 10.75

Remarks: Shells juvenile, oblong, spire acute, short; suture canaliculate; body whorl with fine transverse nodulose ridges more prominent towards lower part, as well as above shoulder; colour orange brown with dark purple blotches at its lower part; aperture dark purple. This species can be distinguished from closely allied species, *C. virgo* by the presence of transverse cords.

Distribution: India: Lakshadweep, Andaman and Nicobar Islands. Elsewhere: Maldives. It is recorded for the first time from these Islands.
119. *Conus geographus* Linnaeus


*Measurements* : L. 25.21; W. 11.55

*Remarks* : Juvenile, spire concave, mildly canaliculate, spirally striated and coronated, apex rose tinted; outer lip partly damaged, interior of aperture with purple with white band. Shell occupied by hermit crab, *Calcinus* sp.

*Distribution* : *India* : Lakshadweep, Krusadai Island, Tuticorin, Rameswaram, Andaman and Nicobar Islands. *Elsewhere* : Throughout tropical Indo-Pacific (Subba Rao, 1980). It is the first record of this species from these Islands.

120. *Conus litteratus* Linnaeus


*Measurements* : L. 75.90 - 94.05; W. 47.12 - 64.26

*Remarks* : It can be easily distinguished by its remarkable colouration, shell usually with rows of chocolate brown, round or squarose spots on white background; spire flat; closely agrees with *C. millepunctatus* but differs from it in the absence of yellow bands and in having more number of spots.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands, Tuticorin, South India (Hornell, 1921). *Elsewhere* : Tropical Indo-Pacific from Zanzibar to Viti Islands (Subba Rao, 1980).

121. *Conus miles* Linnaeus


*Remarks* : Recognised by its pale yellowish colour with dark brown transverse bands on the body whorl, one at middle part and other at just above base, fine undulating longitudinal light brown lines; spire flatly obtuse.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands, Tuticorin. *Elsewhere* : East Africa to Polynesia. Earlier records from Minicoy were by Hornell (1921) and Nagabhushanam and Rao (1972).

122. *Conus miliaris* Hwass in Bruguiere


Measurements: L. 23.02 - 24.06; W. 15.90 - 16.90

Remarks: Shell though smaller in size exhibits all the characters of the species.

Distribution: India: Lakshadweep, Andaman and Nicobar Islands. Elsewhere: Red Sea to Sandwich, Galapagos Islands (Subba Rao, 1980). It is a first record from these islands.

123. Conus musicus Hwass in Bruguiere


Measurements: L. 13.50 - 14.75; W. 8.40 - 8.42

Remarks: It can be distinguished by the presence of a characteristic dark violet colouration on the base of the body whorl.


It is recorded from the east coast of India under the name of C. pusillus (Melvill & Standen, 1898).

124. Conus rattus Hwass in Bruguiere


Measurements: L. 33.45; W. 21.85

Remarks: The shell is greenish brown with a faint band at the middle of the body whorl, shoulder with white maculations.


125. Conus tulipa Linnaeus


Measurements: L. 53.12 - 57.25; W. 25.65 - 27.60
**Description**: Shell oblong, ventricose, inflated; spire acute, short, coronated, canaliculated and spirally striated; body whorl smooth, bluish white with fine broken lines of reddish brown colour arranged in rows; two broad brown bands, one on the upper and the other on the lower part of the body whorl; aperture narrow posteriorly but widening gradually towards anterior end; interior of aperture purplish violet; shell covered with thin transparent brown periostracum with five rows of thickened outgrowths; animal purplish in colour.

**Remarks**: It is a venomous species and its sting has the capacity to kill a man (Abbott and Dance, 1982).


126. *Conus virgo* Linnaeus


**Material**: Kalpeni: 1 ex., Coll. T. K. Mallik.

**Remarks**: It can be distinguished by the presence of a dark purple blotch at the anterior part of the body whorl and depressed spire. Shell smooth, either white or light cream in colour, covered by brown leathery periostracum.


**Family XXXV TEREBRIDAE**

**Genus 67. Terebra Bruguiere, 1729**

127. *Terebra affinis* Gray


**Material**: Kavaratti: 1 ex., Coll. B.P.H., 29.3.1984.

**Measurements**: L. 10.00; W. 3.10

**Remarks**: It is a juvenile specimen but agrees with characters and figure given by Cemohorsky (1967) and Abbott and Dance (1982) except in colouration.


128. *Terebra felina* (Dillwyn)

1817. *Buccinum felinum* Dillwyn, *Catalogue of Recent shells* : 644 (Type locality: not given).

Measurements: L. 41.65; W. 10.92

Remarks: It can be recognised by the presence of a single row of brown spots on lower part of each whorl just above the suture; shell smooth and narrower than that of *T. maculata*, spiral whorls plicate body whorl with additional row of the fine brown spots at its base.


129. *Terebra maculata* (Linnaeus)


Measurements: L. 48.05 - 137.80; W. 15.38 - 36.05

Remarks: It is one of the largest species of the genus and can be distinguished by its ornamentation, two rows of dark brown blotches/maculations below the suture and another on lower part of the whorl just above the suture, earlier one broader than the latter; body whorl with three brown transverse bands; earlier whorls plicated axially. One of the shells found encrusted with epizoic shells, *Saptandanta nasika* Prashad and Rao on its spire.


Order ENTOMOTAENIATA

Family XXXVI PYRAMIDELLIDAE

The material includes a single species under the genus *Pyramidella*.

Genus 68. *Pyramidella* Lamarck, 1799

130. *Pyramidella sulcata* (A. Adams)

1854. *Obeliscus sulcatus* A. Adams. In: Sowerby's *Thesaurus conchylorum* or *Figures and descriptions of recent shells*, London, *Obeliscus*, sp. 807, pl. 171, fig. 34. (Type locality: Tahiti, Coral sand)


Measurements: L. 14.32 - 22.50; W. 5.84 - 9.45
Remarks: Shell glossy, smooth, maculated with chocolate brown blotches.


Order CEPHALASPIDEA
Family XXXVII ACTAEONIDAE
Genus 69. Pupa (Bolten) Roeding, 1798

131. Pupa solidula (Linnaeus)

1972. Pupa solidula : Cemohorsky, Marine shells of the Pacific, 2 : 203, pl. 58, figs. 1 la,b.


Measurements: L. 12.84 - 7.00; W. 12.85 - 5.90

Remarks: Shells eroded and in the one from Kalpeni sculpture could not be made out, but the other shell has spiral cords and grooves with axial striations, columella with bifid fold at its anterior end.


Order BASOMMATOPHORA
Family XXXVIII SIPHONARIIDAE

The family includes air breathing limpets which inhabit the zone at high water mark and above on sea shore. Animals possess lungs instead of gills for breathing.

Genus 70. Siphonaria Sowerby, 1824

Shell possesses on the interior a horse-shoe shaped muscle scar and a shallow siphonal groove on the right hand margin at the anterior end. Except for these characters the shells are similar to that of limpet belonging to the families Acmaeidae and Patellidae.

132. Siphonaria funiculata Reeve
(Plate III, Figs. 23 & 24)

1856. Siphonaria funiculata Reeve, Conch., 9, Siphonaria, sp. 6, pl. 2, fig. 6a-b. (Type locality: Van Diemens Land).


Measurements: L. 7.00 - 13.20; W. 4.60 - 10.25

Description: Shell ovate, limpet-like, spire elevated, slightly posterior, sculptured
with radiate ribs and ridges in between, ridges white in colour, interstices light brown; interior smooth, deep groove extends from centre to margin on right side represented out side by elevated double ridge; muscular scar impression incomplete, horse-shoe shaped, interior colour light brown, muscular scar white.

**Remarks**: These animals found attached to rocks, and tree trunks above the tide mark on shore line; closely resemble other limpets of the families Acmaeidae and Patellidae but differs from them in having a siphonal groove into which lung cavity opens.

**Distribution**: India: Lakshadweep only. Elsewhere: Sydney. This is the first record of this species from Indian waters.

Family XXXIX PLANORBIDAE

Genus 71. **Indoplanorbis** Annandale and Prashad, 1921

133. **Indoplanorbis exustus** (Deshayes)

(Plate III. Figs. 25 & 26)


**Measurements**: L. 4.80 - 6.42; W. 7.35 - 12.46

**Remarks**: It is the most common freshwater snail of the mainland India. It can be recognised by its discoidal shell with convex whorls. It serves as an intermediate host of many helminth parasites.

**Distribution**: India: Lakshadweep, Andamans and widely distributed in Indian mainland. Elsewhere: Bangladesh, Pakistan, Burma, Sri Lanka, Thailand, Malay peninsula and Archipelago, Thailand, China and Iran.

It is the first record from these Islands, and may be a recently introduced species. Smith (1903) did not report it.

Order STYOMMATOPHORA

Family XL ENIDAE

Genus 72. **Rhachis** Albers, 1850

134. **Rhachis punctatus** (Anton)


Measurements: L. 6.95 - 12.80; W. 3.45 - 5.65

Distribution: India: Lakshadweep, (Minicoy-Smith, 1903); West Bengal, Orissa, Tamil Nadu, Maharashtra, Uttar Pradesh. Elsewhere: Maldives, Africa, Zanzibar, Mozambique, Sri Lanka.

Family XLI SUBULINIDAE

Genus 73. Lamellaxis Strebel, 1882

135. Lamellaxis gracile (Hutton)


Measurements: L. 7.59 - 11.28; W. 2.85 - 3.22


Order ANASPIDEA

Family XLII APLYSIIDAE

The family is represented by two species under two genera in the present studies.

Genus 74. Aplysia Linnaeus, 1767

136. Aplysia (Varria) corinigera Sowerby

1869. Aplysia corinigera Sowerby, in Reeve's Conch. Icon. 17, Aplysia, sp. 40, pl. 9, fig. 40 (Type locality: Island of Zebu).


Distribution: India: Lakshadweep, Krusadai Island and Ennur near Madras. Elsewhere: Sri Lanka, Philippines. It is the first record of the species from these Islands.

Genus 75. Dolabella Lamarck, 1801

137. Dolabella ecaudata Rang


**Distribution**: India: Lakshadweep; Andamans. It is the first record from these Islands.

**Order** SOLEOLIFERA

**Family XLIII** ONCHIDIDAE

The family includes marine slugs. Single species under the genus *Onchidium* has been included.

**Genus 76. Onchidium** Buchanan, 1800

138. *Onchidium verruculatum* Cuvier


**Measurements**: L. 53.50 - 66.86; W. 44.60 - 46.32.

**Remarks**: It is a common sea slug occurring along Indian coast including Andaman and Nicobar Islands. It can be easily recognised by the presence of tubercles and warts on its dorsal surface, which are more prominent towards its posterior end where these can be seen in groups. Ventral part has a powerful foot and tentacles are of moderate size. Animals usually occur on muddy beaches (in shallow waters). Also seen among the rock crevices in supra littoral zone. Animals found feeding on algal mass attached to rocks.


It is the first record of this species from these Islands.

**Class** BIVALVIA

**Order** ARCOIDA

**Family XLIV** ARCIDAE

**Genus 77 Arca** Linnaeus, 1758

139. *Arca avellana* Lamarck


**Remarks**: The species can be distinguished by a strong keel at its posterior end; raised umbo; broad ligamental area; strong and coarse sculpture behind the keel.

It is very common in coral reefs. It was earlier reported as *Arca imbricata* and *A. maculata* from Minicoy by Smith (1906) and Nagabhushanam and Rao (1972) respectively.

Genus 78. Barbatia Gray, 1842
Subgenus Barbatia S.Str.

140. Barbatia (Barbatia) amygdalumtostum (Roeding)
1798. Arca amygdalumtostum Roeding, Museum Boltenianum: 175, sp.no. 226 (Type locality: Not given, refers to Chemintz, pl. 54, fig. 534).


Remarks: The shells are partly eroded, but very clearly exhibit the specific characters.

It was reported earlier under the name Arca fusca Bruguiere which is a synonym of the present species.


It is recorded for the first time from these Islands.

Genus 79. Acar Gray, 1857

141. Acar plicata (Dillwyn)
1817. Arca plicata Dillwyn, Descriptive Catalogue of Recent Shells, 1: 227, sp. 5 (Type locality: Red Sea, Also refers to Chemnitz, Conchy Cab. 11, 244, pl. 204, fig. 2008).


Measurements: L. 3.95 - 4.65; Ht. 2.52 - 2.62; T. 2.70 - 2.74.

Remarks: Shell small, not exceeding 5 mm., found encrusted with corals. It can be distinguished from B. amygdalumtostum by its nodular sculpture and keel on its posterior part. The shell shows the teeth characters of that of the genus Barbatia.


It is recorded for the first time from these Islands.

Order MYTILIDAE
Family XLV MYTILIDAE
Genus 80 Modiolus Lamarck, 1799
142. **Modiolus philippinarum** (Hanley)


**Measurements**: L. 19.00 - 23.78; Ht. 12.25 - 15.52; T.7.84-15.42.

**Distribution**: India: Lakshadweep, Orissa, Nicobars. Elsewhere: It has a wide distribution in the Indo-Pacific Region.

**Order** PTERIOIDA

**Family XLVI** PTERIIDAE

**Genus 81** *Pinctada* Roeding, 11798

The genus includes pearl producing oysters, characterised by long, straight hinge, with two wings on either side; left valve slightly deeper than right.

143. **Pinctada fucata** (Gould)


**Measurements**: L. 8.78 - 23.80; Ht. 9.45 - 24.25; T. 3.20 - 6.00


**Family XLVII** SPONDYLIDAE

**Genus 82** *Spondylus* Linnaeus, 1788

144. **Spondylus layardi** Reeve

1856. *Spondylus layardi* Reeve, *Conch. Icon.*, 9, *Spondylus* sp. 66, pl. 18, fig. 66 (Type locality: Ceylon = Sri Lanka).


**Measurements**: L. 40.65-52.16; Ht. T.26.65-72.75

**Remarks**: Shell triangularly ovate; sculptured with radiate ridges and striations; ridges armed with prickles, outer surface with coral encrustations completely covering the original shell sculpture; interior white; margin crenulate; bordered with purple brown or yellow colour. Shells usually purplish red in colour.

**Distribution**: India: Lakshadweep, Bombay. Elsewhere: Sri Lanka. It is the first record from these Islands.
145. *Spondylus multisetosus* Reeve

1856. *Spondylus multisetosus* Reeve, *Conch. Icon.*, 9, *Spondylus*, sp. 11, pl. 3, fig. 11 (Type locality : Philippines).


**Measurements**: L. 26.40-36.70; Ht. 31.50-47.00

**Remarks**: Shell triangularly ovate, thin with irregular margin, inequivalve, right valve deep, hinge nearly straight extending to form wings on either side, triangularly produced area curved right; two strong teeth on each valve, strongly interlocking; right wing more produced with deep notch below; outer surface sculptured with large number of radial ridges armed with fine, short thin spines, interspaces with fine nodulose radial threads with minute prickles throughout; inner surface smooth, margin smooth; muscular impression sublateral, shell white in colour tinged with yellow blotches on its outer surface.


Family XLVIII  OSTREIDAE

**Genus 83** *Saccostrea* Dollfus and Dautzenberg, 1920

146. *Saccostrea cucullata* (Born)


1780. *Ostrea cucullata* Born, *Testacea Musei Caesarri Vindobonensis* : 114 pl. 6, figs. 11, 12 (Type locality : “Indies and Ascesion Island”).


**Measurements**: L. 30.60 - 44.45; Ht. 42.68 - 65.35; T. 8.65 - 9.45

**Remarks**: Occurs in clusters on rocks and coral reefs, sometimes on jetty piles near the entrance of harbours. Shell variable, margin wavy, lower valve concave, upper one flat; outer surface deep violet, some times extends to its inner margin; inner surface white; its margin with fine tubercles all along, except on umbonal area, adductor muscle round, white in colour.


**Genus 84** *Crassostrea* Sacco, 1897

147. *Crassostrea rivularis* (Gould)


**Measurements**: L. 28.45 - 41.48; Ht. 35.70 56.70; T. 14.15 - 19.18
Description: Shell somewhat disc shaped, hinge narrow, lower valve slightly concave, upper valve slightly convex; outer surface with concentric growth lines lamellate, interior smooth, white, outer margin thin, rarely light brown; adductor muscle scar nearly round, white in colour; occasionally light pink blotch present towards lower part.


148. Crassostrea sp.


Measurements: L. 29.50; Ht. 42.15; T. 21.25.

Description: Shell more or less oblong, thick, hinge area large, lower valve more deeper, upper valve flat, surface rugged, sculpture concealed by coral growth, interior smooth, white, adductor muscle scar oblong, smoky white, one side of the margin deep violet in colour, rest white.

Remarks: Though it closely resembles Crassostrea virginica but differs in having white adductor muscle impressions. It differs from the former species in having a thick shell, muscular impression more oblong, margin violet, hinge area large.

Order VENEROIDA

Family XLIX LUCINIDAE

Genus 85 Codakia Scopoli, 1777.

149. Codakia punctata (Linnaeus)


Measurements: L. 24.27 - 59.05; Ht. 25.55 - 57.78; T. 9.89 - 27.05.

Description: Shell semi-orbicular, compressed, sculptured with fine concentric striae and growth lines; radiately grooved, groves narrow, distantly placed in the middle, closer towards sides; shell white, light yellowish within, rosy brown towards anterior margin but rest of the margin dark rose.


Genus 86 Ctena Moerch, 1861

150. Ctena bella (Conrad)


Measurements: L. 10.50 - 30.12; Ht. 9.45 - 29.50; T. 4.60 - 18.80.

Description: Shell orbicular, sculptured with fine concentric growth lines, prominent radial ribs, ribs tuberculate; lunule deep, shell white externally and internally.


Family L CHAMIDAE
Genus 87 Chama Linnaeus, 1768
Subgenus Chama S.str.

151. Chama (Chama) isotoma Conrad


Measurements: L. 38.25; Ht. 52.58; T. 27.20

Description: Shell externally with concentric and radial ridges, interior smooth, white, margin deep purple. This species can be distinguished by its concentric laminae, looks like plaited frills and by its purple colouration on its interior.


It is recorded for the first time from these Islands.

152. Chama (Chama) multisquamosa Reeve

(Plate III. Figs. 27 & 28)

1846. Chama multisquamosa Reeve, Conch. Icon., 4, Chama, sp. 12, pl. 3, fig. 12 (Type locality: Tatong, Island of Luzon, Philippines).


Description: Shell ovately rounded, inflated, sculptured with closely irregular scales, white in colour, interior smooth, margin finely crenulate, rose tinged, hinge with single horizontal thick tooth on its right valve and corresponding groove on its left valve.

Remarks: Shell generally attached by the left valve which is deeper than right valve. Inhabits coral reefs and rocks in the intertidal zone. The species can be distinguished from the former by its scaly surface and white colour.
Distribution: India: Lakshadweep, Andamans. Elsewhere: Philippines. It is recorded for the first time from Indian waters.

Family LI CARDITIDAE
Genus 88 Cardita Bruguiere, 1792

153. Cardita variegata Bruguiere

1792. Cardita variegata Bruguiere, Encyclopedie Methodeique, vers. 1: 404, pl. 223, fig. 6. (Type locality: Bengal).


Measurements: L. 15.95 - 36.55; Ht. 10.85 - 22.50; T. 9.60 - 27.15

Description: Shell somewhat thick, solid and oblong, sculptured with strong radial ribs, ribs scaly. Shell white with brown markings on its ribs.

Remarks: These are found in shallow-water coral reefs, most of the shells found covered with coral encrustations.


Family LII CARDIIDAE
Genus 89 Ctenocardia H. & A. Adams, 1857

154. Ctenocardia fornicata (Sowerby)


Measurements: L. 4.92 - 9.25; Ht. 4.65 - 8.95; T. 2.50 - 4.90 Valve L. 14.50; Ht. 11.95

Description: Shells mostly juvenile, white in colour, some of the shells found tinged with light brown on the inner side of the valve.

Shell quadrate in shape; prominent keel on posterior part; sculptured with radiating ribs, ribs ornamented with short spines (eroded in the present collection).

Remarks: Ctenocardia, which was earlier treated as a subgenus is now elevated to generic level (Keen, 1969).

Family LIII  TRIDACNIDAE
Genus 90  Tridacna Bruguiere, 1797
Subgenus  Chamotrachea Moerch, 1853

155. Tridacna (Chamotrachea) maxima (Roeding)

1798. Tridachnes maxima Roeding, Museum Boltenianum : 171, sp. 184 (Type locality: 'Mauritius' SD, Rosewater, 1965).


Remarks : Juvenile specimens but the specific characters are clear. Tridacna cumingi Reeve recorded by Nagabhushanam and Rao (1972) from Minicoy should be treated under the present species.

Distribution : India : Lakshadweep, Andaman and Nicobar Islands. Elsewhere : East Africa to eastern Polynesia except Hawaii (Rosewater, 1965). It is recorded for the first time from these islands.

Family LIV  MACTRIDAE
Genus 91  Mactra
Subgenus  Mactra s.str.

156. Mactra (Mactra) luzonica Deshayes

1846. Mactra luzonica Deshayes, Préc. sool. Soc. Lond., (1846) : 64, sp. 12 (Type locality : Luzon, Philippines).


Measurements : L. 12.30 – 18.60; Ht. 9.30 – 13.35

Remarks : Valve partly eroded; umbonal area and pallial sinus with purple tinge; very common on the sandy beaches.

Distribution : India : Lakshadweep; coasts of Bombay; Goa; Tamil Nadu; Orissa; West Bengal; Andaman and Nicobar Islands. Elsewhere : Sri Lanka, Burma, Philippines, Australia.

Family LV  MESODESMATIDAE
Genus 92  Atactodea Dall, 1895

157. Atactodea glabrata (Gmelin)

1791. Mactra glabrata Gmelin, Syst. Nat. ed. 13 : 3258, sp. no. 7 (Type locality : "Oceano Africano et Indico")


**Measurements**: L. 14.72 - 29.20; Ht. 12.46 - 23.20; T. 6.20 - 14.25

**Description**: Shell subtrigonal, thick, solid, compressed, porcellaneous, smooth, hinge strong, resilium narrow, pallial sinus short, white in colour, ventral margin light brown to chocolate.

**Remarks**: Closely agrees with *Mactra* but differs from it by shell being more solid, or compressed, and in having a narrow resilium and short pallial sinus. It is recorded from Tamil Nadu Coast as *Mesodesma glabratum*.


Family LVI DONACIDAE

Genus 93. *Donax* Linnaeus

Subgenus *Latona* Schumacher, 1817

158. **Donax (Latona) faba** Schroeter


**Remarks**: The species can be distinguished by the following characters: ovate triangular shape; usually white in colour stained with purple streaks or blotches; outer surface smooth; posterior ventral area crenulate; interior smooth, white, occasionally purple colour. Common in the intertidal zone of sandy beaches.

**Distribution**: India: Lakshadweep, Bombay, Ratnagiri, Malabar coast, Tamil Nadu coast, Andaman and Nicobar Islands. Elsewhere: Indo-Pacific. It is recorded for the first time from these Islands.

Family LVII TELLINIDAE

Genus 94. *Tellina* Linnaeus, 1758

Subgenus *Quidnipagus* Iredale, 1929

159. **Tellina (Quidnipagus) palatum** (Iredale)


Measurements: L. 31.55 - 63.75; Ht. 25.30 - 50.25

Description: Shell externally with heavy concentric cords interrupted by small granules, beaks almost central, posterior margin recurved. Shell externally white, interior pale yellow, the yellow colour more pronounced towards umbonal area. Occurs in subtidal 20 M (Abbott and Dance, 1982).


Subgenus Scutarcopagia

160. Tellina (Scutarcopagia) scobinata Linnaeus

1758. Tellina scobinata Linnaeus, Syst. Nat., ed. 10: 676, sp. 49 (Type locality: "O. Asiatica").
1972. Scutarcopagia scobinata: Cemohorsky, Marine shells of the Pacific, 2: 229, pl. 65, fig. 5.


Measurements: L. 31.40 & 47.06; Ht. 26.70 & 44.14.

Remarks: It is distinguished by the rounded shape, sculpture of raised, trigonal, obliquely arranged scales, which are more prominent towards the margin. Shell white, umbo light cream with chocolate brown markings on the outer surface, interior light cream. Inhabits shallow waters.


Subgenus Arcopagia Brown, 1827

161. Tellina (Arcopagia) remies Linnaeus

1758. Tellina remies Linnaeus, Syst. Nat., ed. 10: 676, sp. no. 48 (Type locality: "O. Europae et Indico").


Measurements: L. 18.95; Ht. 17.25; T. 7.74

Remarks: Shell semi-orbicular in shape, sculptured with fine concentric ribs.


Subgenus Arcopaginula Lamy, 1918

162. Tellina (Arcopaginula) inflata Gmelin


Measurements: L. 13.15; Ht. 10.55

Remarks: Shell juvenile, smooth, posterior area with a rib, postero-ventral margin light brown.

Shell collected from a dredge sample near Lagoon entrance.

Distribution: India: Lakshadweep, Bombay, Goa, Andaman and Nicobar Islands. Elsewhere: Indo-Pacific. East Africa to Philippines. It is recorded for the first time from these Islands.

Genus 95. Macoma Leach, 1819
Subgenus Scissulina Dall, 1924

163. Macoma (Scissulina) relicula (Sowerby)


Measurements: L. 7.00; Ht. 4.10; T. 2.10

Valves: L. 10.35 - 20.15; Ht. 5.30 - 14.25

Remarks: This species can be distinguished by its fine reticulate sculpture on its surface in addition to oblique striae, juveniles more elongate.

Distribution: India: Lakshadweep, Andamans. Elsewhere: Mauritius. It is recorded for the first time from these Islands.

Family LIx VENERIDAE

Genus 97. Gafrarium Roeding, 1798

165. Gafrarium pectinatum (Linnaeus)

1758. Venus pectinatum Linnaeus, Syst. Nat., ed. 10, sp. 120 (Type locality: India).


Measurements: L. 9.56 - 40.75; Ht. 6.60 - 31.20; T. 3.00 - 18.84.

Remarks: It is a commonest species of the genus in the Indian waters. It can be recognised by its surface sculpture of strong nodulose radial ribs, interstices as broad as ribs in middle and more towards sides; pallial sinus very short. Juveniles more oblong.

Distribution: India: Lakshadweep, common on both east and west coasts of India including Andaman and Nicobar Islands. Elsewhere: Indo-Pacific.

Genus 98. Marcia H. and A. Adams, 1857

Subgenus Marcia s.str.

166. Marcia (Marcia) pinguis (Schroeter)

1788. Venus pinguis Schroeter, Conch. Cab. Nomen Register, 10: 112 (Type locality: East Indian Seas, Refer Chemnitz).


Measurements: L. 30.45; Ht. 26.00

Remarks: It is very common in Indian backwaters.


Genus 99. Timoclea Brown, 1827

167. Timoclea scabra (Hanley)


Measurements: L. 14.00 & 14.30; Ht. 11.50 & 12.40

Remarks: It is distinguished by the scabrous sculpture; strong radial and concentric
ribs, radial ribs divaricate; shell small, triangularly ovate, with crenulate margin inside.


It is recorded for the first time from these Islands.

**Order** MYOIDA

**Family** LX GASTROCHAENIDAE

**Genus** 168. Gastrochaena Spengler, 1783

168. Gastrochaena cuneiformis Spengler


**Measurements**: L. 17.45 - 17.85; Ht. 8.80 - 10.01; T.6.96 - 8.20

**Remarks**: It can be recognised by a wide gap on the ventral side which extends from the anterior end to the middle of the ventral margin; shell inequilateral, anterior part narrow, pointed, umbo subterminal. Ventral margin obliquely descending in front, rounded behind, posterior part rounded; shell thin, with concentric sculpture, white in colour.

**Distribution**: India: Lakshadweep, Quilon, Mandapam, Madras; Andamans. Elsewhere: Indo-Pacific.

**SUMMARY**

A consolidated list of molluscs occurring in Lakshadweep includes 424 species, classified under 104 families and 204 genera. Of these only 168 species (60 families and 100 genera) were physically examined by us. From the material studied we find that molluscs were collected from eight islands of Lakshadweep. We may mention here that there is scope for an increase in the number of species, if further intensive surveys were to be made in the coral reefs of the islands, especially with an emphasis on molluscs and also the localities which were not covered during earlier surveys.

On the basis of the present study, 60 species are recorded for the first time from these islands. Out of these as many as five species have already been reported from the neighbouring Maldivian Islands. The following 13 species are recorded for the first time from Indian waters: *Peasiella tantilla* (Gould), *Angiola lineata* (da Costa), *Balcis inflexa* (Pease). *Mauritia depressa* (Gray), *Mauritia scurra* (Gmelin), *Polinices maurus* Lamarck, *Cymatium parthenopium* (Von Salis), *Cymatium sinense* (Reeve), *Bursa cruentata* (Sowerby), *Chicoreus crocatus* (Reeve), *Lairus belcheri* (Reeve), *Siphonaria funiculata* Reeve and *Chama multisquamosa* Reeve. However, all these species are known to have Indo-Pacific distribution.

One significant finding of the present study is the occurrence of *Indoplanorbis exustus* (Deshayes), which is a common freshwater mollusc in the Indian mainland. The species was not mentioned either by Smith (1903) or Hornell (1921). It can be inferred
that the species is a recent introduction, and may have been introduced along with aquatic plants from the mainland. The species serves as an intermediate host for trematode parasites, which cause diseases in cattle.

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REFERENCES


1 & 2. *Angiola lineata* (da Cosia) 8.40x3.92. (in mm.)
3 & 4. *Peasella tantilla* (Gould) 3.12x2.80. (in mm.)
7 & 8. *Mauritia scura* (Gmelin) 29.00x16.32
9 & 10. *Polynices mauros* (Lamarck) 21.55x17.45
11 & 12. *Mauritia depressa* (Gray) 35.50x25.62
13 & 14. *Cymatium (Ranularia) sillense* (Reeve) 32.80 x 22.10.

15 & 16. *Cymatium parthenopium* (Von Salis) 23.05 x 11.40.


19 & 20. *Chicoreus crocatus* (Reeve) 50.24 x 38.50.
21 & 22. *Latirus belcheri* (Reeve) 39.05 x 24.28.
25 & 26. *Indoplanorbis exustus* (Deshayes) 6.60 x 12.78.
( Upper valve )
Bell’s (1903) report on the echinoderms of the Maldive and Laccadive Archipelagoes, was based on the material collected mainly from the Maldive group of islands and only Minicoy of the Lakshadweep. Subsequently some echinoderms were reported by Clark (1925) Koehler (1899-1927) and others. Several species of echinoderms from the Lakshadweep in the reference collection of the Central Marine Fisheries Research Institute, Mandapam were listed and a new species belonging to a new genus was described by James (1969, 1976). Three species of echinoderms from the Lakshadweep identified by the present author were listed by Mallik (1979). The list of Nagahushanam and Rao (1972) included several species from the Minicoy island, which require confirmation.

The present report is based on the material collected by the author and his colleagues during their recent surveys of these islands and published accounts. However, species from deeper waters far off from the Lakshadweep islands proper and some of doubtful identity or locality have been excluded. Most conspicuously, no crinoids have been reported from the Lakshadweep though several species are known to occur in the nearby Maldive group of islands with a similar topography. Only Asteroidea, Ophiuroidea and Echinoidea are dealt with here, since the holothurians are being treated separately.

All the species so far known from the Lakshadweep have been listed and also keyed for easy identification. Under each species only important references are cited and material examined, brief description and geographic range of distribution are provided. For species no material of which from the Lakshadweep is available to the author, important characters based on material from elsewhere or from literature are given under remarks. The following abbreviations are used in the text:

ASTEROIDEA: R = distance from the centre of the mouth to the tip of the arm;  
               r = distance from the centre of the mouth to the interradial margin.

OPHIUROIDEA: d.d. = diametre of the disc.

ECHINOIDEA: D = ambital diametre  or  L = length of the test.

LIST OF ASTEROIDEA KNOWN FROM THE LAKSHADWEEP

Order  VALVATIDA

Family  OREASTERIDAE

1. Culcita novaeguineae Mueller and Troschel
*2. Culcita schmideliana (Retzius)
3. Pentaceraster regulus (Mueller and Troschel)

Family OPHIDIASTERIDAE
4. Dactylosaster cylindricus (Lamarck)
5. Leiaster leachi (Gray)
6. Linckia guildingi Gray
7. Linckia laevigata (Linnaeus)
8. Linckia multifora (Lamarck)
9. Paraferdina laccadivensis James

Family ASTEROPSEIDAE
*10. Asteropsis carinifera (Lamarck)

Family ASTERINIDAE
11. Asterina burtoni Gray
*12. Disasterina leptalacantha (H.L.Clark)
*13. Tegulaster ceylanicus (Doederlein)

Order SPINULOSIDA
Family ACANTHASTERIDAE
14. Acanthaster planci (Linnaeus)
(* New to India)

Key to ASTEROIDEA of the Lakshadweep

1. Arms short, not distinct, interradial areas wide; form pentagonal; adults with high abactinal surface and no distinct marginal plates; juveniles with flat abactinal surface and distinct marginals .......................................................... 2

Arms long and distinct; interradial areas narrow ........................................... 3

2. Pore areas confluent; abactinal tubercles present in the pore areas ............... .............................................................. Culcita novaeguineae

Pore areas separated by secondary plates of the abactinal reticulum; pore areas free from any abactinal tubercles ........................................ Culcita schmideliana

3. Arms wide at the base and flat below, not cylindrical; abactinal covering of flat polygonal granules; no spines on arms, only conical tubercles on the marginal plates .......................................................... Pentaceraster regulus

Arms cylindrical and abactinal covering of thick skin or rounded granules or spines; if arms are wide at the base, the abactinal surface with skin covering and distinct carinal and marginal series of spines or short abactinal spinelets but no polygonal granule covering .......................... 4
4. Arms cylindrical; abactinal plates covered by thick skin or rounded granules; no abactinal spines
   ..........................................................................................................: 5
   Arms wide at the base and flat below; if appearing cylindrical abactinal spines long and pointed
   ..........................................................................................................: 10

5. Abactinal skin covering thick; no abactinal granulation........... *Leiaster leachi*
   Abactinal covering of rounded granules; skin covering if present very thin, not obscuring the abactinal plates
   ..........................................................................................................: 6

6. Abactinal plates in regular longitudinal series; abactinal granules in groups at the centre or near the distal margin of the plates
   ...................................................................................... *Dactylosaster cylindricus*
   Abactinal plates at the most in regular series only at the base of the arm; abactinal plates completely covered by round granules
   ..........................................................................................................: 7

7. Subambulacral areas with low granulation similar to rest of the actinal area; no distinct subambulacral armature
   ...................................................................................... *Parafedina laccadivensis*
   Subambulacral areas with enlarged tubercles distinct from the actinal granulation
   ..........................................................................................................: 8

8. Subambulacral armature in two or three series and close to the furrow spines without intervening actinal granules
   ...................................................................................... *Linckia guildingi*
   Subambulacral armature in a single row of spaced tubercles with intervening actinal granules and well separated from the furrow spines by granulation
   ..........................................................................................................: 9

9. Arms five, stout, blunt at tip, generally subequal; madreporite single; uniformly blue or fawn coloured
   ...................................................................................... *Linckia laevigata*
   Arms usually more than five, slender, slightly tapering towards the tip, usually unequal in length; madreporites two or more; variegated with red or brown on dull grey
   ...................................................................................... *Linckia multifora*

10. Arms 15 or more, flat below but appearing cylindrical from above; madreporites six or more; abactinal spines long and pointed
    ...................................................................................... *Acanthaster planci*
    Arms usually five, sometimes up to eight, wide at the base and flat below, not at all appearing cylindrical
    ..........................................................................................................: 11

11. Abactinal plates in regular longitudinal series, not imbricating, covered by thick skin; arms carinate above with a series of spines on the carinal row of abactinal plates; superomarginal plates with a single spine and extending beyond the inferomarginals; no spine on the inferomarginal plates
    ...................................................................................... *Asteropsis carinifera*
    Abactinal plates imbricating, not in regular longitudinal series; abactinal plates with granule-like spines or almost naked, no distinct carinal series of spines; inferomarginal plates extending beyond the superomarginals and each with a bunch of spines
    ..........................................................................................................: 12
12. Actinal plates with up to four short stout blunt spines................. *Asterina burtoni*
   
   Actinal plates each with only a single long pointed spine .......................... 13

13. A naked patch of skin without actinal plates in each interradius behind the oral plates.................................................. *Disasterina leptalacantha*
   
   Actinal plates not leaving any naked patch behind the oral plates in the interradial areas................................................. *Tegulaster ceylanicus*

**SYSTEMATIC ACCOUNT**

1. **Culcita novaeguineae** Mueller and Troschel
   (Pl I, fig. 1)
   
   1971. *Culcita novaeguineae* : Clark and Rowe, Monograph of shallow-water Indo west Pacific echinoderms, 34, 54

   **Material** : Agatti : One specimen, B.P. Haldar, 24.xii.1979; R = 65 mm
   
   **Description** : Adult form pentagonal; arms not discernible. Abactinal plates in an open reticulum providing spaces for pore zones. Poriferous areas usually interconnected or rarely separated only narrowly by the secondary plates. Abactinal spines small and tubercle-like, scattered on the abactinal plates and in the pore areas. Oral surface flat, covered by flat granules. Supero- and inferomarginal plates not distinct.
   
   **Remarks** : In juvenile specimens, both the supero- and inferomarginal plates form a distinct vertical margin and the abactinal surface is flat.
   
   **Distribution** : Lakshadweep to Hawaiian Islands.

2. **Culcita schmideliana** (Retzius)
   (Pl I, figs 2 and 3)
   
   1971. *Culcita schmideliana* : Clark and Rowe, Monograph of shallow-water Indo west Pacific echinoderms, 34, 53


   **Description** : Adult form pentagonal, arms not discernible. Abactinal plates forming a reticulum enclosing pore areas. Pore areas separated by the secondary plates of the abactinal reticulum. Abactinal spines short and tubercle-like. No abactinal spines in the pore areas. Actinal surface flat, covered by flat granules. Supero- and inferomarginal plates not distinct.
   
   **Remarks** : In juveniles the supero- and inferomarginal plates form a distinct vertical border and the abactinal surface is flat.
The above two species resemble each other very closely and the colour variation exhibited by them is not specific.

**Distribution**: East coast of Africa to Lakshadweep. The species was not reported earlier from the Lakshadweep.

3. **Pentaceraster regulus** (Mueller and Troschel)


**Remarks**: The species listed by James (1969) based on material from Chetlat, is characterised by five equal arms, closely packed flat polygonal granule-covering and absence of spines, though sometimes enlarged conical granules may be present on the marginal plates.

**Distribution**: Lakshadweep to western Pacific Ocean.

4. **Dactylosaster cylindricus** (Lamarck)

(PI II, fig.9)

1903. *Ophidiaster cylindricus*: Bell, in: *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 226


**Description**: Arms five, cylindrical. Abactinal plates in regular longitudinal series; skin covering very thin; abactinal granules in groups at the centre or distal margin of the abactinal plates imparting a rugged appearance.

**Remarks**: In most of the specimens the arms are unequal. Only in a very few specimens the shorter arms are evident to be due to damage. As the species is not known to be fissiparous, the unequal arms might be due to growth differences.

Live specimens were variegated with reddish or brownish patches matching with the dull undersurfaces of the dead corals and crevices inhabited by them.

**Distribution**: East coast of Africa to Hawaiian Islands.

5. **Leiaster leachi** (Gray)


**Remarks**: The species listed by James (1969) based on material from Bitra, is characterised by cylindrical arms with skin covering and absence of granulation or spines.

**Distribution**: East coast of Africa to Hawaiian Islands.
6. Linckia guildingi Gray

(Pl I, figs 5 and 6)

1903. Linckia laevigata : Bell, in : Fauna and Geography of the Maldive and Laccadive Archipelagoes, 1 : 226 (part)

[non: Asterias laevigata Linnaeus, 1758]

1971. Linckia guildingi : Clark and Rowe, Monograph of shallow-water Indo-west Pacific echinoderms, 36, 61

Material : Agatti : Three specimens, D.R.K. Sastry, 5.6.iv.1984; R = 140-175 mm

Description : Arms five, cylindrical, stout and blunt at the tip. Abactinal plates not in regular longitudinal series. Thick granule covering on the actinal and abactinal plates. Madreporite single. Adambulacral plates with flat and chisel-like furrow spines and subambulacral spines in two or three series close to the furrow spines with no intervening actinal granulation.

Remarks : Part of the material from Minicoy reported by Bell (1903) as L. laevigata was referred by Clark and Davies (1966) to L. guildingi after re-examination.

Live specimens were of uniform fawn colour.

Distribution : East coast of Africa to Hawaiian Islands.

7. Linckia laevigata (Linnaeus)

(Pl II, fig. 7)

1758. Asterias laevigata Linnaeus, Syst. Nat., 662
1903. Linckia laevigata : Bell, in : Fauna and Geography of the Maldive and Laccadive Archipelagoes, 1 : 226 (part)

1903. Scytaster novaecaledoniae : Bell, in : Fauna and Geography of the Maldive and Laccadive Archipelagoes, 1 : 226 (part)

[non: Scytaster novaecaledoniae Perrier, 1875]


Description : Arms five, equal, cylindrical, blunt at tip. Abactinal plates not in regular longitudinal series. Actinal and abactinal plates completely covered by round granules. Madreporite single. Adambulacral plates with small tubercle-like furrow spines and enlarged granule-like subambulacral armature in a single series much separated from the furrow spines by three or four rows of fine actinal granules.

Remarks : The blue specimens from Minicoy reported by Bell (1903) as Scytaster novaecaledoniae were referred by Clark (1921) to L. laevigata. Live specimens were uniformly blue or fawn coloured.

Distribution : Each coast of Africa to Hawaiian Islands.
8. *Linckia multifora* (Lamarck)  
(Pl II, fig. 8)


**Description**: Arms five or often more, generally unequal, slender, tapering to a narrow tip. Abactinal plates not in regular longitudinal series. Abactinal and actinal plates completely covered by rounded granules. Madreporites two or more. Ambulacra with a single series of enlarged tubercles in the furrow with intervening granules and a single series of spaced enlarged granules in the subambulacral area with intervening actinal granules and separated from the furrow series by two to four series of actinal granules.

**Remarks**: The specimens are mostly 4-7 armed and some are single arms with or without regenerating arm-buds. Some of the specimens have gall-like protrusions harbouring parasitic gastropods. Live specimens were variegated with dull reddish and greyish patches matching with the crevices and undersurfaces of dead corals inhabited by them.

**Distribution**: East coast of Africa to Hawaiian Islands.

9. *Paraferdina laccadivensis* James


**Material**: Holotype: Minicoy, Z.S.1. Reg. No. E 1435/1; R = 35 mm

**Description**: Abactinal surface covered by polygonal plates, the plates not imbricating, leaving spaces for papular pores. Superomarginal plates oval, slightly convex. Actinal side devoid of papular pores. Furrow spines in a single series, covered by granules on the abradial surface. Abactinal and actinal surfaces including the subambulacral area completely covered by fine granules, finer and closer on the superomarginal plates.

**Distribution**: Known only by the Type from the Type locality.

10. *Asteropsis carinifera* (Lamarck)  
(Pl I, fig. 4)


**Description**: Arms five, equal, wide at the base, flat below and carinated above.
Abactinal plates rounded or rounded quadrangular, in regular longitudinal series, carinal series of plates each with a short blunt spine. Superomarginal plates oval, distinct from the abactinal and inferomarginal plates, extending beyond the inferomarginal plates, each with a single short spine. Inferomarginal plates relatively larger than the superomarginal plates, no inferomarginal spines. Actinal intermediate plates in longitudinal series parallel to the adambulacrals, longest series adjoining the adambulacrals and shortest near the interradical inferomarginals. Adambulacrals with 4-5 furrow spines, the middle ones longer, and a single series of large, flat, chisel-like subambulacral spines.

Remarks: Hotchkiss and Clark (1976) revived the family with the emended spelling ASTEROPSEIDAE, from the synonymy of Poraniidae. The thick skin covering of the live specimens obscuring the underlying plates was variegated with red patches and spots on dull grey and olive green. The structure and arrangement of the plates is however discernible after drying.

Distribution: East coast of Africa to Hawaiian Islands. The species was not reported earlier from the Lakshadweep.

11. Asterina burtoni Gray

(Pl I, fig. 10)

1971. Asterina burtoni : Clark and Rowe, Monograph of shallow water Indo west Pacific echinoderms, 38, 68


Description: Arms five or more, flat below, somewhat convex above, subequal or 2-3 arms shorter than the rest. Abactinal plates imbricating, covered by short granule-like blunt spinelets. Superomarginals not very distinct from the abactinal plates. Inferomarginals extending beyond the superomarginals, each with a tuft of 6-12 pointed spines. Actinal plates in regular series, each with 3-4 short blunt stout spines. Adambulacrals with four spines arranged in a fan in the furrow and 2-3 stout subambulacral spines. Oral plates with six spines on each side.

Remarks: The material includes two specimens with equal arms, a single arm with five regenerating arm-buds and the rest of five or six unequal armed specimens. Live specimens were variegated with red and dull green.

Distribution: East coast of Africa to Hawaiian Islands. The species was not reported earlier from the Lakshadweep.

12. Disasterina leptalacantha (H.L. Clark)

(Pl VII, figs 38-41)

1971. Disasterina leptalacantha : Clark and Rowe, Monograph of shallow water Indo west Pacific echinoderms, 38, 67

Material: Agatti: One specimen, B.P. Haldar, 27.xii.1979; R = 27 mm, r = 9 mm

Description: Arms five, equal, well differentiated from the disc, breadth at the base
9-10 mm, tapering to a narrow tip. Abactinal plates on disc in five elevated groups of larger plates in the interradii - one of the groups harbouring the small madreporite - central and radial regions partially naked with scattered smaller plates. Arms with irregularly arranged plates leaving naked areas at the base, plates on the midradial region irregularly arranged and not reaching the tip of the arm, regular series of somewhat ovate, slightly imbricating plates laterally. Papular pores single, scattered on disc and in about 6-8 series at the base of the arm, only two series reaching up to about four-fifths of the arm. Superomarginal plates not distinct from the rest of the abactinals. Inferomarginal plates distinct with a tuft of sacculate spines - the actual number could not be counted in the dried condition - the plates reaching beyond the superomarginals. Actinal intermediate plates in seven series interradially, only the series adjacent to the adambulacrals reaching the tip of the arm, each with a single sacculate spine, actinal plates absent behind the oral plates in the interradii leaving a large naked patch with only sacculate spines in four interradii and a smaller patch in the fifth. Oral plates with eight marginal spines, the innermost the longest, and two spines on the actinal surface. Adambulacrals with five, rarely six-furrow spines on the first, and four on the rest, and two subambulacrals spines. The spines of the oral and adambulacral plates are slightly calcified at the base leaving a sacculate tip.

Remarks: The specimen had a thick skin covering obscuring the abactinal plates in wet condition. The present specimen differs from the description of *D. leptalacantha* given by Livingstone (1933) in having two spines on the actinal surface of oral plates, two subambulacral spines on adambulacrals and the abactinal plates without a notch for the papular pores. Clark and Rowe (1971) characterised the species as having two subambulacral spines. The specimen agrees with *D. leptalacantha* and simultaneously differs from *D. abnormalis* in having more number of marginal spines on the oral plates and more number of furrow spines on the adambulacral plates. However, R is 3r in the present specimen while it is only 2-2.5r in both the species. This however might be due to the state of preservation and drying.

Mortensen (1933) described *africana* n. var. under the species from South Africa, characterised by all actinals with a spine and seven marginal spines on each side of the jaw as in the present specimen.

The present specimen was collected from live *Acropora* in subtidal waters and was red in formalin.

Distribution: South Africa, India (Lakshadweep) and Australia (Queensland). The species was not reported earlier from the Lakshadweep.

13. *Tegulaster ceylanicus* (Doederlein)

(Pl II, figs 11,12; Pl VII, figs 36,37)


Material: Agatti: One specimen, B.P. Haldar, 27.xii.1979; R = 21 mm. r = 7 mm

Description: Arms five, equal, breadth 8 mm at the base, flat below, somewhat raised at the base above. Abactinal plates around the anus small with minute spinelets, surrounded by a circle of larger elongate plates; a small madreporite close to and outside
the circle in interradial position. Rest of the abactinal plates on the disc and proximal midradial areas of the arms irregularly arranged with a notch for the papular pores. Arms slightly keeled midradially in the distal half, midradial series with larger plates and lateral series of smaller plates, slightly imbricating. Papulae scattered on the disc, absent in the interradii, in 6-7 series at the base of the arm, only the middle series on either side reaching beyond two-thirds of the arm length. Superomarginals not distinct, slightly rounded, terminal plates larger and distinct. Inferomarginals plates extending beyond the superomarginals, each with a tuft of 6-8 slender spines. Actinal intermediates in regular series closely packed upto the oral plates leaving no naked areas in the interradii; only the series adjacent to the adambulacrals reaching the tip of the arm, each with a single long slender pointed spine slightly bulged at the base. Oral plates with six marginal spines, the innermost the longest, and a single pointed spine on the actinal surface, rarely two on odd plates. Adambulacrals with four, rarely five, furrow spines and two subambulacral spines.

**Remarks**: The specimen was collected from live *Acropora* in subtidal waters along with the one of the preceding species and was red in formalin.

**Distribution**: Lakshadweep and Sri Lanka. The species was not reported earlier from the Lakshadweep.

14. *Acanthaster planci* (Linnaeus)  
(Pl. III, fig. 13)


**Material**: Bangaram: Two specimens, B.P. Haldar, 23,25.xii.1979; Kavaratti: One specimen, D.R.K. Sastry, 5.ii.1986; R = 60-145 mm

**Description**: Arms 15 to 20, equal, flat below, rounded above. Disc and arms covered by long stout pointed spines. Spines on oral side shorter and pointed. Madreporites 7-8.

**Remarks**: The species is associated with live coral beds, sometimes taking shelter under stones close to the live colonies. Live specimens were reddish on the actinal side and reddish violet on the abactinal side.

**Distribution**: East coast of Africa to Hawaiian Islands.

LIST OF OPHIUROIDEA KNOWN FROM THE LAKSHADWEEP

**Order**  PHRYNOPHIURIDA

**Family**  OPHIOMYXIDAE

1. *Ophiomyxa australis* Luetken

**Order**  OPHIURIDA

**Family**  AMPHIURIDAE

2. *Amphipholis squamata* (Delle Chiaje)
Family OPHIACTIDAE
3. Ophiactis savignyi (Mueller and Troschel)

Family OPHIOTRICHIDAE
*4. Macrophiothrix demessa (Lyman)
5. Macrophiothrix longipeda (Lamarck)
6. Macrophiothrix propinqua (Lyman)
7. Ophiorthix (Ophiorthix) trilineata Luetken
8. Ophiorthix (Acanthophiothrix) purpurea von Martens
*9. Ophiorthix (Acanthophiothrix) vigelandi Clark
10. Ophiorthix (Keystonea) nereidina (Lamarck)

Family OPHIOCOMIDAE
11. Ophiocoma anaglyptica Ely
12. Ophiocoma brevipes Peters
13. Ophiocoma dentata Mueller and Troschel
14. Ophiocoma erinaceus Mueller and Troschel
15. Ophiocoma pica Mueller and Troschel
16. Ophiocoma scolopendrina (Lamarck)
17. Ophiocoma valenciae Mueller and Troschel
18. Ophiocomella sexradia (Duncan)
19. Ophiomastix annulosa (Lamarck)

Family OPHIONEREIDAE
20. Ophionereis porrecta Lyman

(* New to India. Ophiocoma lubrica is not included since the type specimens are damaged and their identity is uncertain)

Key to OPHIUROIDEA of the Lakshadweep

1. Disc and arms covered by thick skin; dorsal arm plates rudimentary and fragmented ................................................................. Ophiomyxa australis
Disc scales distinct or covered by granules or spines; dorsal arm plates distinct and complete or with two supplementary arm plates ............................................. 2

2. A pair of prominent infradental papillae below the lowest tooth which is usually wide and squarish, and two lateral papillae on each side of the jaw completely closing the jaw-slit ............................................................... Amphipholis squamata

A single infradental papilla or a cluster of papillae below the lowest tooth or none
at all; lateral papillae absent or many, if only two they are located far behind separated by a wide gap from the tip of the jaw........................................... 3

3. Only two lateral papillae located distally................................. *Ophiactis savignyi*

Lateral papillae absent or more than four on each side ........................................... 4

4. No lateral papillae................................................................................. 5

Lateral papillae present in a series along the jaw .................................................. 11

5. Dorsal arm plates with a light transverse line bordered by blue areas ..................

................................................................. *Ophiothrix (Keystonea) nereidina*

Dorsal arm plates variegated or with longitudinal lines........................................ 6

6. Dorsal arm plates longer than broad or only as wide as long.................. 7

Dorsal arm plates more than twice as broad as long ............................................. 9

7. Dorsal arm plates as wide as long........................................... *Ophiothrix (Ophiothrix) trilineata*

Dorsal arm plates longer than broad........................................................................ 8

8. Radial shields broader in the middle or proximally and without any stumps or spines....................................................... *Ophiothrix (Acanthophiothrix) purpurea*

Radial shields broader distally and with stumps close to the adradial margin...........

................................................................. *Ophiothrix (Acanthophiothrix) vigelandi*

9. Dorsal arm plates with acute laterodistal angles, widest near the distal margin......

................................................................. *Macrophiothrix longipeda*

Dorsal arm plates with laterodistal areas bent backwards, widest at about middle of the plate........................................................................................................ 10

10. Disc covered by thorny stumps; dorsal arm plates with rugose granules; ventral arm plates longer than broad........................................... *Macrophiothrix demessa*

Disc scales naked; dorsal arm plates bare; ventral arm plates wider than long .......

................................................................. *Macrophiothrix propinqua*

11. Supplementary dorsal arm plates present; infradental papillae not in a cluster, only one or two.......................................................... *Ophionereis porrecta*

Dorsal arm plates entire, no supplementary plates; infradental papillae in a cluster below the lowest tooth.......................................................... 12

12. Six-armed fissiparous forms; single tentacle scale, rarely two on an odd proximal pore ........................................................................................................ 11
SASTRY: *Echinodermata*

Only five arms; two tentacle scales at least on the first five segments.........13

13. Disc covered by spaced spinelets; dorsal arm plates with light margin; oral shields with concentric markings; uppermost arm spine clavate...........*Ophiomastix annulosa*

Disc covered by granules; uppermost arm spines not clavate though sometimes club-shaped.................................................................14

14. Similar number of spines on each side of the arm segments................15

Alternating number of usually 3 and 4 spines on each side of the same or adjacent segment.................................................................18

15. Some disc granules enlarged or spiniform; one tentacles scale on all but the first five segments......................................................*Ophiocoma valenciae*

Disc granules uniform in size; two tentacle scales on more than five proximal segments........................................................................16

16. Dorsal arm plates with acute laterodistal angles and straight lateral margins; ventral interradial disc granulation not approaching the oral shield area; disc with light or golden coloured radiating lines on dorsal side............*Ophiocoma pica*

Upper arm plates ovate with rounded lateral margins; disc granulation completely covering the ventral interradial areas up to the oral shields; no radiating lines on dorsal disc........................................................................17

17. Second and third upper arm spines shorter than the breadth of upper arm plate; dorsal disc with olive green and yellow reticulation, ventral side pale yellow, dorsal arm plates green..............................................*Ophiocoma brevipes*

Upper arm spines longer than the breadth of the dorsal arm plate; dorsal disc uniformly dark, ventral side uniformly brown or variegated with brown and light patches, dorsal arm plates dark brown with light margin, sometimes with a light central area.................................................................*Ophiocoma dentata*

18. Disc granules flat; a group of exposed and enlarged scales in ventral interbranchial regions; fourth arm spine flask-shaped.................*Ophiocoma anaglyptica*

Disc granules rounded; no enlarged scales in the ventral interbranchial regions.....19

19. Disc and arms uniformly black on upper and lower surfaces............*Ophiocoma erinaceus*

Disc and arms black or variegated on upper side, uniformly light or variegated on oral side..............................................................*Ophiocoma scolopendrina*

**SYSTEMATIC ACCOUNT**

1. *Ophiomyxa australis* Luetken

Remarks: The species listed by James (1969) based on material from Minicoy, is characterised by rudimentary and fragmented dorsal arm plates and a thick skin covering all over the specimen obscuring the details of the different plates on oral and upper sides.

Distribution: East coast of Africa to western Pacific Ocean.

2. **Amphipholis squamata** (Delle Chiaje)

(Mil III, fig. 15)


Description: Dorsal disc scales distinct, central ones a little larger than the rest. Radial shields large, half the disc radius in length, twice as long as wide, contiguous. Ventral disc scales smaller, imbricate. Oral papillae three on each side of the jaw - one infradental and two lateral papillae, the distal papilla operculiform, twice as broad as middle one - together closing the oral slit. Adoral shields meeting in front of the oral shields. Dorsal arm plates wider than long, distal margin convex. Arm spines three, as long as the segment. Two tentacle scales.

Remarks: The species was common in the turtle-grass beds of the lagoon close to the island at Kavaratti and Minicoy.

Distribution: East coast of Africa to Hawaiian Islands. The species was not reported earlier from the Lakshadweep.

3. **Ophiactis savignyi** (Mueller and Troschel)

(Mil III, fig. 14)


Material: Minicoy: Eight specimens, D.R.K. Sastry, 14, 17.ii.1986; d.d. = very small to 3 mm

Description: Dorsal disc scales distinct, often larger in the vicinity of the radial shields. Scattered spinelets on the dorsal disc. Radial shields large, contiguous at the distal end. Arms often six, unequal. Dorsal arm plates elliptical with rounded lateral margins and convex distal margin with a median lobe made prominent by a dark spot on either side. Arm spines six, rugose and spinulated. Oral shields large, adoral shields smaller, not meeting proximally; oral plates with two lateral papillae located distally on the jaw.

Remarks: The live specimens were dark green in colour. The species is known to
be fissiparous and inhabits a variety of habitats such as crevices, sponges, algae and turtle-grass beds.

**Distribution** : Tropical Atlantic, Indian and Pacific Oceans.

4. *Macrophiothrix demessa* (Lyman)

(Pl III, fig. 16)


**Material** : Kavaratti: One specimen, D.R.K. Sastry, 8.ii.1986; d.d. = 6.5 mm; arms over 80 mm long.

**Description** : Disc covered by thorny stumps; radial shields with similar but shorter stumps. Dorsal arm plates with distal border convex, laterodistal corners bent back, rounded granules on the dorsal arm plates. Ventral arm plates longer than broad; lateral arm plates with 12 thorny spines, upper ones longest, lowest comb-like.

**Remarks** : Live specimens were blue variegated with darker bands of 3-4 segments in width on arms.

**Distribution** : East coast of Africa to Hawaiian Islands. The species was not reported earlier from the Lakshadweep.

5. *Macrophiothrix longipeda* (Lamarck)

(Pl III, fig. 17; Pl VI, fig. 31)


**Material** : Agatti: Three specimens, B.P. Haldar, 27, 29.xii.1979; Androth : One specimen, B.P. Haldar, 20.xii.1979; Kavaratti : five specimens, B.P. Haldar, 3,4.i.1980 and D.R.K. Sastry, 7,9.ii.1986; d.d. = 5-20 mm, arms 10-12 times d.d.

**Description** : Disc covered with thorny stumps, radial shields with rugose granule-like stumps. Dorsal arm plates more than twice as broad as long; distal margin with a straight median region and slightly bent lateral regions; laterodistal angles acute; broadest near the distal margin. Ventral arm plates octogonal; distal margin straight. Lateral arm plates with upto 10 thorny spines; lowest spine comb-like.

**Remarks** : Live specimens were variegated with bluish violet and usually with dark spots along the distal border of the dorsal arm plates and at the middle of the distal border of ventral arm plates. The specimens were usually found with the disc deep under rubbles or in burrow or a crevice with only three of the arms making serpentine movements in the overlying waters.

**Distribution** : East coast of Africa to western Pacific Ocean. The species was not reported earlier from the Lakshadweep.
6. Macrophiothrix propinqua (Lyman)

(Pl III, fig. 18)


*Material*: Agatti: Four specimens, D.R.K. Sastry, 4.iv.1984; d.d. = 5-7 mm

*Description*: Dorsal disc scales distinct, tubercles on the disc scattered. Radial shields almost naked. Dorsal arm plates broader than long; distal margin convex with the laterodistal regions bent back; broadest region at about half the length of the plate. Arms variegated or uniformly blue with darker bands of 3-4 segments.

*Distribution*: East coast of Africa to western Pacific Ocean. The species was not reported earlier from the Lakshadweep.

7. Ophiothrix (Ophiothrix) trilineata Luetken

(Pl V, fig. 26)

1971. *Ophiothrix (Ophiothrix) trilineata* : Clark and Rowe, *Monograph of shallow -water Indo- west Pacific echinoderms*, 84, 111

*Material*: Kavaratti: One specimen, D.R.K. Sastry, 29.iii.1984; d.d. = 7 mm

*Description*: Disc scales covered by scattered spinelets. Radial shields bare. Dorsal arm plates as wide as long, distal margin convex with a beak-like median tapering, a median light coloured longitudinal line bordered by darker areas on either side and two more lighter lines bordered by darker areas on either side. Ventral arm plates broader than long, distal margin convex. Lateral arm plates with 6-8 arm spines, not more than 3-4 times the length of the segment, second spine from above is the longest.

*Remarks*: The light and dark longitudinal lines of the dorsal arm plates extend on the dorsal disc between the radial shields. The rest of the specimen is uniformly blue in colour.

*Distribution*: East coast of Africa to western Pacific Ocean. The species was not reported earlier from the Lakshadweep.

8. Ophiothrix (Acanthophiothrix) purpurea von Martens


*Material*: Off Kiltan Island, 55-91 m (30-50 fms) : Four specimens, R.I.M.S. *INVESTIGATOR*; d.d. = 3.5-6.5 mm

*Description*: Disc slightly indented interradially in the largest specimen and deeply in the others, disc spines long and thorny, central disc scales naked in the smallest specimen. Radial shields large, widest at the middle or near the proximal end, bare without any stumps. Dorsal arm plates longer than broad, proximally truncated with convex distal margin and a dark median longitudinal line. Ventral arm plates longer than broad, distal margin convex on a few proximal segments, soon becoming concave. Oral
SASTRY: *Echinodermata*

shields much wider than long with a small pointed tip in the middle of the proximal margin. Adoral shields longer than broad, set horizontally, meeting in front of the oral shields. Oral plates with only terminal infradental papillae, no lateral papillae, Arm spines proximally five, very long, thorny and pointed.

**Remarks**: Koehler (1898) reported the above material as *Ophiothrix lepidus*, and mentioned only three specimens.

**Distribution**: East coast of Africa to South Pacific Islands.

9. **Ophiothrix (Acanthothiothrix) vigelandi** Clark

(Pl IV, fig, 19)


**Material**: Minicoy: One specimen, B.P. Haldar, 12.xii.1979; d.d. = 3 mm

**Description**: Disc covered by short trifid stumps and long slender pointed spines. Radial shields bare. Dorsal arm plates rhombic, longer than broad, beaked distally. Ventral arm plates broader than long, distal margin concave. Lateral arm plates with 6-9 slender, pointed, thorny spines, as long as 3-4 arm segments.

**Remarks**: The specimen is of uniform blue colour with a pale median longitudinal line on the dorsal arm plates, prominent at the beak of the distal margin.

**Distribution**: Lakshadweep and western Pacific Ocean. The species was not reported earlier from the Lakshadweep.

10. **Ophiothrix (Keystonea) nereidina** (Lamarck)


1903. *Ophiothrix nereidina*: Bell, in : *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 1 : 229


**Remarks**: The species listed by James (1969) based on material from Bitra, is characterised by distinct disc plates naked except for a few scattered spinelets at the centre and margin of the disc, and blue dorsal arm plates broader than long with a transverse light coloured band across the middle.

**Distribution**: East coast of Africa to South Pacific Islands.

11. **Ophiocoma anaglyptica** Ely


**Remarks**: The species listed by James (1969) based on material from Chellat, is characterised by the presence of exposed and enlarged scales in the interbrachial areas of the disc and flat granule-covering.

**Distribution**: Lakshadweep and tropical central Pacific Ocean.
12. **Ophiocoma brevipes** Peters

(Pl IV, fig. 21)

1903. *Ophiocoma brevipes* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 228

**Material** : Agatti : One specimen, D.R.K. Sastry, 4.iv.1984; Androth : Two specimens, B.P. Haldar, 20.xii.1979; d.d. = 5-11 mm

**Description** : Disc granulation rounded, uniform in size, covering the dorsal side completely and ventral interbrachial areas up to the distal border of the oral shields. Arms stout; dorsal arm plates ovate with rounded lateral margins and broader than long. Arm spines up to five, blunt, flattened, second from above shorter than the breadth of the arm plate of the segment.

**Remarks** : The disc is of pale colour with green reticulation on the dorsal side, and pale yellow or white on the ventral side. Dorsal arm plates and spines are green.

**Distribution** : East coast of Africa to Hawaiian Islands.

13. **Ophiocoma dentata** Mueller and Troschel

(Pl IV, fig. 22)


**Description** : Disc granules rounded, uniformly covering the dorsal side and ventral interbrachial areas up to the distal border of the oral shields. Dorsal arm plates broader than long, lateral margins rounded. Arm spines five, flat, second from above longer than the breadth of the segment.

**Remarks** : The specimens are black or dark brown in colour; dorsal arm plates with a light border along the margin and sometimes a light central region.

**Distribution** : East coast of Africa to Hawaiian Islands.

14. **Ophiocoma erinaceus** Mueller and Troschel

(Pl IV, fig. 23)

1903. *Ophiocoma erinaceus* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 228

**Material** : Agatti : Four specimens, B.P. Haldar, 27.xii.1979 and D.R.K. Sastry,

**Description**: Disc granules round, completely covering the dorsal side of the disc and extending into a V-shaped interbrachial area on the ventral side of the disc. Dorsal arm plates broader than long, asymmetrical, narrower on one side. Arm spines alternatingly 3 and 4 for greater part of the arm length.

**Remarks**: The specimens are uniformly black all over the disc, arms, and spines on the dorsal as well as ventral sides, no light colouration or variegation.

**Distribution**: East coast of Africa to Hawaiian Islands.

15. **Ophiocoma pica** Mueller and Troschel

(Pl V, fig. 25)


**Description**: Disc granules uniform in size, completely covering the disc on dorsal side and extending into a V-shaped area on ventral interbrachial region. Dorsal arm plates with distal margin broader and convex, proximal border narrow. Ventral arm plates broad. Arm spines upto six, thick, flat, or round, and pointed, upper ones longest.

**Remarks**: The specimens are brown in colour with radiating yellow lines on dorsal disc and transverse bands on the proximal border of the dorsal and ventral arm plates or sometimes only light patches on either side narrowly meeting in the middle of the plate.

**Distribution**: East coast of Africa to Hawaiian Islands.

16. **Ophiocoma scolopendrina** (Lamarck)

(Pl IV, fig. 24)

1826. *Ophiura scolopendrina* Lamarck, Anim. s. vert., 2 : 544
1903. *Ophiocoma scolopendrina*: Bell, in : Fauna and Geography of the Maldives and Laccadive Archipelagoes, 1 : 228


**Description**: Disc granules rounded, completely covering the dorsal side of the disc and a V-shaped area of the ventral interbrachial region. Dorsal arm plates broader than long, asymmetric, narrower on one side. Arm spines alternatingly 3 and 4, stout, upper ones shorter and club shaped.

**Remarks**: The dorsal side is uniformly dark, some times variegated with light
spots or patches on the arms. The ventral side is light coloured or variegated, never uniformly dark.

**Distribution**: East coast of Africa to Hawaiian Islands.

### 17. Ophiocoma valenciae Mueller and Troschel


1903. *Ophiocoma valenciae*: Bell, in: *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1: 229

**Remarks**: The species is characterised by marginal and ventral disc granules distinctly higher than thick; only one tentacle scale at least beyond the fifth segment; arms seven times the disc diameter in length.

**Distribution**: Devaney (1970) and Clark and Rowe (1971) restricted the range from Persian Gulf and East coast of Africa to Mascarene Islands in the western Indian Ocean, doubting the further eastern records.

### 18. Ophiocomella sexradia (Duncan)

(Pl IV, fig. 20)


**Material**: Kavaratti: Two specimens, D.R.K. Sastry, 7.ii.1986; d.d. = 4 and 6 mm.

**Description**: Disc granules longer than stout, pointed on radial shields and interradial disc margin. Arms six, three times the disc diameter in length. Dorsal arm plates as long as broad or slightly broader than long, distal margin convex, proximally acute. Ventral arm plates longer than broad, distal margin convex and lateral margins concave. Arm spines four, small, as long as the breadth of the segment. Tentacle scale single.

**Remarks**: Some odd first tentacle pores have two tentacle scales. Dorsal disc with green patches, ventral side green variegated. Spines are green. Dorsal side of arms with dark bands of 3-4 segments.

**Distribution**: East coast of Africa to Hawaiian Islands.

### 19. Ophiomastix annulosa (Lamarck)

(Pl VIII, fig. 42)


1903. *Ophiomastix annulosa*: Bell, in: *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1: 229


**Remarks**: The species listed by James (1969) and Bell (1903) based on material from Minicoy, is characterised by spaced blunt spines on the dorsal disc; claviform upper arm spine; light coloured margin of the dorsal arm plates and concentric light and dark colouration on the oral shields.
Distribution: Maldives and Minicoy to South Pacific Islands.

20. Ophionereis porrecta Lyman

1971. Ophionereis porrecta: Clark and Rowe, Monograph of shallow-water Indo west Pacific echinoderms, 88, 122

Material: Off Kiltan Island, 55-91 m (30-50 fms): Three specimens, R.I.M.S. INVESTIGATOR; d.d. = 7-11 mm

Description: Disc covered by small imbricating plates, larger at the disc margin and between the radial shields. Radial shields small, longer and narrow, widely separated. Principal dorsal arm plates broader than long, proximal margin broader, distal margin narrower. Supplementary arm plates broader distally, as long as the segment. Oral shields longer than broad, with blunt tip on the proximal border; adoral shields long, not meeting interradially; oral plates with 5-6 papillae on each side. Ventral interradial disc with smaller imbricating plates and fine granule covering near the oral shields. Genital slits long, genital papillae present, proximal ones somewhat larger, not extending to the dorsal side. Arm spines three, the middle one longer and blunt.

Remarks: These specimens were reported by Koehler (1898). The other widely distributed species, O. dubia (Mueller and Troschel) differs from O. porrecta in the absence of genital papillae and in the principal dorsal arm plates with much narrower and convex distal margin.

Distribution: East coast of Africa to Hawaiian Islands.

LIST OF ECHINOIDEA KNOWN FROM THE LAKSHADWEEP

Order DIADEMATOIDA
Family DIADEMATIDAE
1. Astropyga radiata (Leske)
2. Diadema savignyi Michelin
3. Echinothrix calamaris (Pallas)
4. Echinothrix diadema (Linnaeus)

Order PHYMOSOMATOIDA
Family STOMECHINIDAE
5. Stomopneustes variolaris (Lamarck)

Order TEMNOPLEUROIDA
Family TOXOPNEUSTIDAE
6. Pseudoboletia maculata Troschel
7. Tripneustes gratilla (Linnaeus)
Order ECHINOIDEA

Family ECHINOMETRIDAE
8. *Echinometra mathaei* (de Blainville)
9. *Echinostrephus molaris* (de Blainville)
10. *Heterocentrotus mammillatus* (Linnaeus)

Order HOLECTYPOIDEA

Family ECHINONEIDAE
11. *Echinoneus cyclostomus* Leske

Order CLYPEASTEROIDEA

Family CLYPEASTERIDAE
12. *Clypeaster rarispinus* de Meijere

Order SPATANGOIDEA

Family BRISSIDAE
13. *Brissus latecarinatus* (Leske)
14. *Metalia spatagus* (Linnaeus)

Key to ECHINOIDEA of the Lakshadweep

1. Anus within the apical system on the aboral side ........................................... 2
   Anus outside the apical system, at the posterior end or on the oral side in the posterior interambulacrum ................................................................. 11

2. Primary tubercles perforate and crenulate; spines hollow and fragile ............. 3
   Primary tubercles imperforate and non-crenulate; spines not hollow ............ 6

3. Genital plates conspicuously elongate ........................................... *Astropyga radiata*
   Genital plates not longer than broad ......................................................... 4

4. Ambulacral primary spines not conspicuously needle-like, only a little more slender than interambulacral primary spines ........................................... *Diadema savignyi*
   Ambulacral primary spines needle-like with backwardly pointed barbs near the tips, contrasting sharply with relatively stouter interambulacral spines ........ 5

5. Ambulacra distinctly bulging aborally near the apical system; interambulacral areas near the apical system bare and greenish; cavity of the interambulacral
primary spines wide; spines banded with violet and green...Echinothrix calamaris
Ambulacra not bulged aborally near the apical system; no green naked interambulacral areas; cavity of the interambulacral primary spines relatively narrower, spines either uniformly dark or banded with light colour..........................
......................................................................................................Echinothrix diadema

6. Ambulacral primary tubercles large extending to three or more arcs of pore pairs...
......................................................................................................Stomopneustes variolaris

Ambulacral primary tubercles small, one per each arc or some arcs without a primary tubercle..............................................................7

7. Gill slits sharp and deep ........................................................................8
Gill slits very shallow ........................................................................9

8. Four or more pore pairs per arc........................................Pseudoboletia maculata
Only three pore pairs arranged horizontally.............Tripneustes gratilla

9. Test circular in aboral view; widest near the flat aboral end; spines very fine, longest on the flat aboral side and projecting upwards......Echinostrephus molaris
Test elongate in aboral view; widest just above the oral flattening; aboral side sloping; spines stout, longest ones at the ambitus and projecting horizontally...10

10. Long axis of the test through amb. I and interamb. 3; aboral spines acute; only four pore pairs per arc ..............................................................Echinometra mathaei
Long axis of test through amb. II and interamb. 4; aboral primary spines massive, club-shaped; aboral secondary spines much flattened; 9-11 pore pairs per arc.........
......................................................................................................Heterocentrotus marmillatus

11. Ambulacra simple with two vertical series of pore pairs running from apical system to the peristomial margin..............................Echinoneus cyclostomus
Ambulacra well developed into petals on aboral side....................................12

12. Lantern and teeth present; test flattened and pentagonal in shape with a low acute margin; aboral side only slightly raised at the apical system...Clypeaster rarispinus
Lantern and teeth absent; test oval; aboral side much raised; margin never very low and acute .............................................................................13

13. Subanal fasciole enclosing kidney shaped area................Brissus latecarinatus
Subanal fasciole enclosing shield or heart shaped area................Metalia spatagus
SYSTEMATIC ACCOUNT

1. Astropyga radiata (Leske)

1778. Cidaris radiata Leske, *Add. ad Klein*, 52
1903. *Astropyga* sp. Bell, in: *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 231
1971. *Astropyga radiata* : Clark and Rowe, *Monograph of shallow-water Indo west Pacific echinoderms*, 140, 152

*Remarks*: The species is characterised by perforate and crenulate primary tubercles; hollow spines; genital plates much longer than wide. While reporting the species from Maldives, Clark and Davies (1966) referred the young specimens recorded by Bell (1903) as *Astropyga* sp. to *Astropyga radiata*.

*Distribution*: East coast of Africa to Hawaiian Islands.

2. Diadema savignyi Michelin

(Pl V, fig. 27)


*Description*: Ambulacral plates diadematoid; primary tubercles perforate and crenulate; primary spines fragile, long, slender, hollow at the centre, pointed and banded with white and dark; anal tube long, without a red ring near the anal opening.

*Remarks*: The species is very close to the similarly widely distributed *D. setosum* which has a red ring on the anal tube just behind the anal opening. The two species can also be differentiated by their tridentate pedicellariae, but these are unfortunately very rare.

*Distribution*: East coast of Africa to South Pacific Islands.

3. Echinothrix calamaris (Pallas)

(Pl V, fig. 28)


*Description*: Test globular; ambulacral areas distinctly bulging aborally near the apical system; ambulacral primary spines fine, needle-like, with backwardly pointed barbs near the distal end; interambulacral primary spines stout, distinctly banded with
green, with wide central cavity; interambulacral areas near the apical system naked and greenish.

**Distribution**: East coast of Africa to Hawaiian Islands.

4. **Echinothrix diadema** (Linnaeus)
   (Pl V, fig. 29)


**Material**: Androth : Six specimens, B.P. Halder, 20.xii.1979; D = 40-83 mm

**Description**: Test globular; ambulacra slightly raised; ambulacral primary spines fine, needle-like, with backwardly pointed barbs near the tip; interambulacral primary spines stout, dark with light bands, central cavity narrow; no naked greenish interambulacral areas near the apical system.

**Distribution**: East coast of Africa to Hawaiian Islands.

5. **Stomopneustes variolaris** (Lamarck)
   (Pl VII, fig. 43)


**Remarks**: The species listed by James (1969) based on material collected from Minicoy, is characterised by compound ambulacral plates of arbacioid type; primary spines long, stout, pointed; imperforate and non-crenulate primary tubercles; and a deep undulating groove between the interambulacral series.

**Distribution**: East coast of Africa to South Pacific Islands.

6. **Pseudoboletia maculata** Troschel


**Remarks**: The species listed by James (1969) based on material from Minicoy, is characterised by short blunt spines; sharp gill slits; ambulacra with four or more pore pairs per arc; and dark patches of red or brown on the test. The very closely related *P. indiana* differs in lacking the colour patches.

**Distribution**: Lakshadweep to Philippines and North Australia.

7. **Tripneustes gratilla** (Linnaeus)
   (Pl VI, fig. 32)


Description: Aboral surface high and sloping, oral side flat; ambulacra with three vertical series of pore pairs arranged horizontally; ambulacral primary tubercles one after 3-4 plates; primary spines short and whitish; globiferous pedicellariae small and numerous; ambulacral areas lighter contrasting with dark interambulacra; gill slits deep and sharply defined.

Distribution: East coast of Africa to Hawaiian Islands.

8. Echinometra mathaei (de Blainville)

(Pl V, fig. 30)

1903. Echinometra lucunter: Bell, in: Fauna and Geography of the Maldive and Laccadive Archipelagoes, I : 231


Description: Forms small, oval in shape, long axis of test through ambulacrum I and interamb 3. Only four pore pairs per arc. Primary spines stout and pointed. Tubercles imperforate and non-crenulate. Gill slits shallow.

Remarks: Colour usually olive green with light tipped spines or blackish with red-tipped spines.

Distribution: East coast of Africa to Hawaiian Islands.

9. Echinostrephus molaris (de Blainville)

1925. Echinostrephus molaris: Clark, Catalogue of recent sea-urchins, 130
1969. Echinostrephus molaris: Clark and Rowe, Monograph of shallow- water Indo west Pacific echinoderms, 142, 157

Remarks: The species reported by Clark (1925) from Minicoy, is characterised by flat aboral surface with upwardly projected longest spines; maximum diametre at the flat aboral end; three pore pairs per arc.

Alcock (1902) also mentioned the occurrence of the species in deep vertical burrows, but no specimens from the Lakshadweep are at present available in the collections.

Distribution: East coast of Africa to Hawaiian Islands.
10. **Heterocentrotus mammillatus** (Linnaeus)  
(Pl VI, fig. 33)


**Material** : Kavaratti : One specimen, D. R. K. Sastry, 29.iii.1984; L = 19 mm  

**Description** : Test oval, long axis through ambulacrum II and interambulacrum 4. Tubercles imperforate and non-crenulate. Primary spines on aboral side massive, club-shaped, particularly large at the ambitus. Secondary spines short with flattened tips. Pore pairs eight or more per arc.  

**Distribution** : East coast of Africa to Hawaiian Islands.

11. **Echinoneus cyclostomus** Leske  
(Pl VI, fig. 34)


**Description** : Forms small, test oval. Ambulacra simple with two vertical series of pore pairs running continuously from the apical end to the pristomial margin. Spines small. Anus in the posterior interambulacrum on the oral side. Colour of live specimens was reddish.  

**Distribution** : Western Atlantic and East coast of Africa to Hawaiian Islands.

12. **Clypeaster rarispinus** de Meijere  
(Pl VIII, fig. 44)

1903. *Clypeaster rarispinus* de Meijere, *Tjdschr. ned. dierk. Vereen.*, (2) 8 : 7  

**Remarks** : The species is characterised by a flat pentagonal test with rounded corners, slightly thickened margin, primaries of petals alternating with demiplates, five genital pores and periproct small, in the posterior interambulacrum on the oral side close to the margin.  

Koehler (1922) reported this species from the Lakshadweep (ILES LACCADIVE) but the location of the station 146, 11°5'45"N 75°4'8"E, 36 fms (66 m) is far away from the eastern most point of Androth of the Archipelago.  

**Distribution** : Red Sea and East coast of Africa to East Indies.
13. **Brissus latecarinatus** (Leske)  
   *(Pl VI, fig. 35)*

1971. *Brissus latecarinatus* : Clark and Rowe, *Monograph of shallow-water Indo west Pacific echinoderms*, 146, 165


*Description*: Test oval, rounded anteriorly, broadest at the middle; highest at the posterior third; no anterior frontal notch; posterior interambulacrum on aboral side slightly raised like a keel. Lateral and posterior paired petals deep and the anterior petal is flush with the surface of the test. Only peripetalous and subanal fascioles present, the latter enclosing a kidney shaped area.

*Distribution*: East coast of Africa to Hawaiian Islands. The species was earlier listed by Mallik (1979) from the Lakshadweep.

14. **Metalia spatagus** (Linnaeus)


*Remarks*: The species listed by James (1969) based on material from Minicoy, is characterised by the presence of peripetalous, anal and subanal fascioles, the subanal fasciole enclosing a shield-like area; and the absence of a subanal projection on the oral side and keel in the posterior interambulacrum on aboral side.

*Distribution*: East coast of Africa to Hawaiian Islands.

**GENERAL REMARKS**

The Lakshadweep are a group of coral atolls lying south-west of Indian peninsula in the Arabian Sea. In general, the lagoon lies on the western side of the island or in some cases surrounds the island(s). Some islands have only a fringing reef all around without a lagoon. On the eastern side of the island with a lagoon to the west, there is a very narrow fringing reef exposed to severe wave action of the battering breakers. The reef zone around the lagoon, for the most part, comprises of dead coral boulders and rubbles fringed by live coral colonies. The crest of the reef zone is only slightly exposed during the flood-tide. The bottom of the lagoon is of coral sand and rubble with extensive patches of acroporid and pocilloporid coral colonies. There are also extensive submerged turtle-grass beds on the lagoon side of the islands. All these habitats shelter a rich echinoderm fauna, as is the case with any coral habitat of the tropical latitudes. A total of 72 species are known from the Lakshadweep, of which holothurians alone account for one-third of the echinoderms. Asteroidea and Echinoidea are represented by 14 species each and the Ophiuroidea by 20 species. Many more species are likely to be added with increasing access to these islands during the recent time. Most conspicuously, no crinoid has so far been reported from these islands although several of them were reported from the nearby Maldives Archipelago with almost similar habitats.
The Lakshadweep group provides different habitats with varying physical conditions such as undersurfaces and crevices of big coral boulders, shingle beds of broken corals, rubbles, live coral habitats, sand zones and submerged turtle-grass beds. The reef area is alternately exposed and submerged by the ebb and flood tides respectively, whereas the lagoon proper is almost calm with little tidal fluctuations or wave action. The seaward side of the reef is further subjected to the fury of the breakers, particularly on the eastern side with greater range of tidal variation. The reef surrounding the lagoon is flat for the greater part with a low crest and is subjected to only a slight wave action.

Among the Asteroidea, forms such as Culcita inhabit the protected habitats of the reef, while several others such as Dactylosaster, and Asteropsis frequently inhabit the crevices and undersurfaces of coral conglomerates, with matching colouration of dull variegations. Forms such as Linckia multifora and Asterina burtoni were common among the shingles and coral rubbles, whereas Acanthaster planci takes shelter during low tide period under dead coral rocks in the immediate vicinity of live coral colonies.

Most of the Ophiuroidea were collected only from the crevices and shingles or coral rubble on the protected side of the reef. However, the amphiurid, Amphipholis squamata was most common in the turtle-grass beds and the ophiactid, Ophioctis savingyi among sponges of the shingle beds and crevices. The ophiotrichid, Macrophiolhrix longipeda characteristically buries its disc in a crevice or deep under the pebbles or coral rubble and two of the arms holding on to the crevice or objects around while the remaining three arms make serpentine movements in the overlying waters. In this condition small mucous balls rolling down the ventral surface of the arms from the distal region towards the mouth can be seen on careful examination. The two sympatric ophiocomid species, Ophioeoma erinaceus and O. scolopendrina generally inhabit identical habitats and usually exhibit slight bathymetric segregation the former occurring in subtidal waters and the latter occupying somewhat higher niches on the shore including the exposed intertidal region at low tide. Surprisingly no such seggregation was noticed at Lakshadweep.

The sea-urchins, Diadema, Echinothrix and Echinometra were seen occupying the crevices and concave depressions of the exposed boulders while the toxopneustid, Tripneustes gratilla inhabited protected sides of the reef areas, particularly on the eastern side. The holcetypoid, Echinoneus cyclostomus was always found in the crevices and more usually under the shingles. Only a single dead test of the spatangoid, Brissus laticarinatus was collected among the coral rubble.

**SUMMARY**

The echinoderm fauna other than Crinoidea and Holothurioidea, comprising of 14 species of Asteroidea, 20 species of Ophiuroidea and 14 species of Echinoidea known so far from the Lakshdweep in the Arabian Sea have been listed, keyed and briefly described. Of the 48 species, five species of Asteroidea, six species of Ophiuroidea and one species of Echinoidea have been newly reported from these islands, of which four species of Asteroidea and two species of Ophiuroidea are also new to the Indian coast.
ACKNOWLEDGEMENTS

My thanks are due to the Director, Zoological Survey of India, for facilities; Administrator, Union Territory of Lakshadweep and Director, Lakshadweep Fisheries, for their co-operation during the survey of the Archipelago and Sri B. C. Haldar for the photographs.

REFERENCES


Mallik, T.K. 1979. Some sedimentological and biological aspects of Kavaratti and
SASTRY: *Echinodermata*


ADDENDUM

After the above account has gone to the press, an important publication of James (1989) entitled 'Echinoderms of Lakshadweep and their Zoogeography' appeared in Bull. cent. mar. Fish. Res. Inst. 43: 97-144. As it is not possible to effect changes at this stage, the important information has been summarised below.

ADDITIONAL RECORDS

CRINOIDEA

Only a broken specimen which could not be identified.

ASTEROIDEA

   Remarks: Oreasterid with pentagonal form and indistinct arms as in Culcita but differs in having distinct marginal plates even in adult stage, well defined triangular pore areas, and no tubercles on the aboral skeletal plates.
   Distribution: Lakshadweep (Kiltan), Gulf of Mannar and Philippines.

   Remarks: Ophidiasterid with abactinal plates not arranged in regular longitudinal series as in Linckia but differs in having spiniform adambulacral armament, and arms flat below and broader at the base. Abactinal plates of unequal size, actinal plates with short blunt spinelets or enlarged granules.
   Distribution: Lakshadweep (Kavaratti) and Maldives to South Pacific Islands.

3. Fromia milleporella Lamarck, 1816. Anim. s. vert. 3 : 564
   Remarks: Differs from F. indica in having abactinal plates of uniform size and fine actinal granulation.
   Distribution: Lakshadweep (Bitra). East coast of Africa to South Pacific Islands.

   Remarks: Asterinid of pentagonal form with interbrachial margin rigid and almost straight.

   Remarks: Echinasterid with cylindrical arms and abactinal plates and their spines in regular longitudinal series.
   Distribution: Lakshadweep (Chetlat) and Mauritius.
OPHIUROIDEA


*Remarks*: Ophiurid with the second tentacle pore concealed behind the oral papillae, radial shields small, disc and dorsal arm plates bordered by smaller scales, arms slender, arm spines short and appressed. Live specimens of dull variegation.

*Distribution*: Lakshadweep (Kavaratti). East coast of Africa to South Pacific Islands. The species has been recently transferred from *Ophiolepis* to *Ophioelephants* g.n. by James, 1987. *J.mar.biol.Ass.India*, 23 (1981) : 15-18


*Remarks*: Ophiurid with the second tentacle pore concealed behind the oral papillae, radial shields large, dorsal arm plates with the supplementary plates restricted to the lateral regions, disc scales and dorsal arm plates not bordered by small plates, arms robust. Cream coloured with a purple star-shaped marking on the disc and purple bands on the arms.

*Distribution*: Lakshadweep (Kavaratti). East coast of Africa to South Pacific Islands.

ECHINOIDEA


*Remarks*: Cidarid (amb. and interamb. plates extending on peristome, interambulacral plates with a single large primary tubercle) with flat miliary spines surrounding the collar of the primary spines, shaft of primary spines distinctly verticillate with 3-4 thorny whorls, pore pairs conjugate.


*Remarks*: Cidarid with pore pairs non-conjugate, apical system bare with only scattered spinelets and minute glassy bumps, shaft of primary spines with anastomosing hairs forming a spongy covering.


*Remarks*: Differs from *D. savignyi* in having a conspicuous red ring near the anal opening.

*Distribution*: Lakshadweep (Kiltan). East coast of Africa to South Pacific Islands.

*Remarks*: Temnopleurid with shallow gill slits, test plates with light colourd radiating striation s and ten spineless vertical bare areas on the test.

*Distribution*: Lakshadweep (Kavaratti) to South Pacific Islands.


*Remarks*: Temnopleurid with shallow gill slits, test plates with sutural pores, primary tubercles crenulate but not perforate, primary spines violet.

*Distribution*: Lakshadweep (Kavaratti) to Philippines.


*Remarks*: Toxopneustid with only 3 pore pairs on each ambulacral plate as in *Tripneustes* but differs in having the pore pairs arranged in arcs, primary tubercle on every alternating ambulacral plate, large globiferous pedicellariae, and horizontal purple and light bands on the test.

*Distribution*: Lakshadweep (Kadmat). East coast of Africa to South Pacific Islands.


*Remarks*: Differs from *C. rarispinus* in having ovate test, posterior margin rounded, margin thickened, and concave oral side.

*Distribution*: Lakshadweep (Chetlat). East coast of Africa to Hawaiian Islands. Keohler (1922) reported the species from 'Iles Laquedive, 30-50 fms.' but not from Maldives as mentioned by James (1989).


*Remarks*: Echinolampadid (anus outside the apical system, lantern absent, test oval as in spatangoids but with peristome at or only slightly anterior to the centre and without fasciole) with oval peristome and few tubercles in the interporiferous zone of petals.

*Distribution*: Lakshadweep (Kiltan). Western Indian Ocean to South Pacific Islands.


*Remarks*: Differs from *F. alexandri* in having pentagonal peristome and crowded tubercles in a series in the interporiferous zone of petals.

SPECIES NOT DEALT WITH

Unfortunately, *Echinometra mathaei* (Echinoidea) listed by James (1969) and also in table 1 from Minicoy is inadvertently missing in the text. Further, *Pseudoboletia maculata* and *Metalia spatagus* (Echinoidea) listed by James (1969) from Minicoy have been omitted attributing the literature record of the latter species only to Nagabhushanam and Rao (1972). In addition, the following species have not been dealt with by James (1989).

- **Asteroidea**: 1. *Disasterina leptalacantha*
- **Ophiuroidea**: 2. *Macrophiothrix demessa*  
  3. *Macrophiothrix propinqua*  
  4. *Ophiothrix trilineata*  
  5. *Ophiothrix purpurea*  
  6. *Ophiothrix vigelandi*  
  7. *Ophiocoma valenciae*  
  8. *Ophionereis porrecta*
- **Echinoidea**: 9. *Astropyga radiata*  
  10. *Clypeaster rarispinus*

In table 1 occurrence of the different species at various islands of Lakshadweep has been summarised. A comparative account of distribution of 255 species at Lakshadweep-Maldive area, Sri Lanka and Andaman & Nicobar Islands has been given in tables 2 to 5.
Fig. 1  *Culcita navaeguineae*: Agatti, $R=65$ mm, abactinal view
Fig. 2  *Culcita schmideliana*: Androth, $R=60$ mm, abactinal view
Fig. 3  Same Kavaratti, $P=70$ mm, abactinal view
Fig. 4  *Asteropsis carinifera*: Kavaratti, $R=70$ mm, abactinal view
Fig. 5  *Linckia guildingi*: Agatti, $R=175$ mm, abactinal view
Fig. 6  Same: Part of actinal side enlarged
Fig. 7. *Linckia laevigata*: Minicoy, R=75 mm, abactinal view

Fig. 8. *Linckia multifora*: Agatti, R=50 mm, abactinal view showing protuberances containing parasitic gastropods

Fig. 9. *Dactyl. saster cylindricus*: Agatti, R=25 mm, abactinal view

Fig. 10. *Asterina burtoni*: Minicoy, R=8 mm in the largest specimen, bactinal view

Fig. 11. *Tegulaster ceylanicus*: Agatti, F=23 mm, abactinal view

Fig. 12. Same: actinal view
Fig. 13. *Acanthaster planci*: Bangaram, R = 145 mm, abactinal view

Fig. 14. *Ophioicetes savignyi*: Minicoy, d.d. = 3 mm, dorsal view

Fig. 15. *Amphipholis squamata*: Minicoy, d.d. = 2 mm, dorsal view

Fig. 16. *Macrochthrix demessa*: Kaviatti, d.d. = 6.5 mm, dorsal view

Fig. 17. *Macrophiothrix longipeda*: Minicoy, d.d. = 20 mm, dorsal view

Fig. 18. *Macrophiothrix propinqua*: Agatti, d.e. = 5.5 mm, dorsal view
Fig. 19. *Ophiothrix (Acanthophiothrix) vigelandi*: Minicoy, d.d.=5 mm, dorsal view.

Fig. 20. *Ophiocomella sexradia*: Kavaratti, d.d.=6 mm, dorsal view.

Fig. 21. *Ophiocoma brevipes*: Androth, d.d.=6 mm, dorsal view.

Fig. 22. *Ophiocoma dentata*: Kavaratti, d.d.=15 mm, dorsal view.

Fig. 23. *Ophiocoma erinaceus*: Kavaratti, d.d.=18 mm, ventral view.

Fig. 24. *Ophiocoma scolopendrina*: Minicoy, d.d.=20 mm, ventral view.
Fig. 25. *Ophiocoma pica*: Kavaratti, d.d. = 6 mm, dorsal view.

Fig. 26. *Ophiothrix (Ophiothrix) trilineata*: Kavaratti, d.d. = 7 mm, dorsal view.

Fig. 27. *Diadema savignyi*: Kavaratti, D = 30 mm, partially aboral view.

Fig. 28. *Echinothrix calamaris*: Minicoy, D = 50 mm, aboral view.

Fig. 29. *Echinothrix diadema*: Androth, D = 60 mm, aboral view.

Fig. 30. *Echinometra mathaei*: Kavaratti, L = 35 mm, aboral view.
Fig. 31. *Macrophiothrix longipeda*: Kavaratti, d.d = 5 mm, dorsal view.

Fig. 32. *Tripneustes gratilla*: Agatti D = 80 mm, aboral view.

Fig. 33. *Heterocentrotus mammillatus*: Kavaratti, L = 19 mm, aboral view.

Fig. 34. *Echinoneus cyclostomus*: Minicoy, L = 42 mm, aboral view.

Fig. 35. *Brissus latecarinatus*: Minicoy, L = 31 mm, aboral view.
Fig. 36. *Tegulaster ceylanicus*: Agatti, R=23 mm, part of abactinal side enlarged.
Fig. 37. Same: part of actinal side enlarged.
Fig. 38. *Disasterina leptalacantha*: Agatti, R=27 mm, abactinal view
Fig. 39. Same: actinal view.
Fig. 40. Same: part of abactinal side enlarged.
Fig. 41. Same: part of actinal side enlarged.
Fig. 42. *Ophiomastix annulosa*: dorsal view.
Fig. 43. *Stomopneustes variolaris*: aboral view.
Fig. 44. *Clypeaster rarispinus*: aboral view.
ECHINODERMATA : HOLOTHURIOIDEA

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INTRODUCTION

The earliest taxonomic account of the holothurians of the Lakshadweep is that of Koehler and Vaney (1908) who dealt with 8 species, 4 of which however, do not belong to the littoral zone. James (1969) listed 16 littoral species, of which 2 are known to occur from the Chetlat, 15 from the Minicoy, one being common to both these islands. Nagabhushanam and Rao (1972) listed 13 species of Holothuroidea from the various ecological niches of the Minicoy island. Recently, Mukhopadhyaya and Samanta (1983) in a paper on the shallow-water holothurians of Lakshadweep reported 12 species including 2 new records. The present paper gives an account of 24 species of Holothurioidae of Lakshadweep hitherto known with a key for their identification. Four species are added as new locality records.

List of littoral holothurians recorded from Lakshadweep:

1. Actinopyga mauritiana (Quoy and Gaimard, 1833)
2. A. miliaris (Quoy and Gaimard, 1833)
3. Bohadschia marmorata Jae ger, 1833
4. Holothuria (Holodeima) atra Jae ger, 1833
5. Holothuria (Lessonothuria) pardalis Selenka, 1867
6. Holothuria (Mertensiothuria) leucospilota (Brandt, 1835)
7. H. (M.) fuscocinerea Jaeger, 1833
8. H. (M.) pervicax Selenka, 1867
9. Holothuria (Microthel) nobilis (Selenka, 1867)
10. Holothuria (Platyperona) difficilis Semper, 1868
11. Holothuria (Semperothuria) cinerascens (Brandt, 1835)
12. Holothuria (Thymiosycia) hilla Lesson, 1830
13. H. (T.) impatiens (Forskal, 1775)
14. H. (T.) arenicola Semper, 1868
15. Labidodemas rugosum Ludwig, 1875
16. Stichopus chloronotus (Brandt, 1835)
17. S. variegatus Semper, 1868
18. *Thelenota ananas* (Jaeger, 1833)
19. *Afrocucurris africana* (Semper, 1868)
20. *Synapta maculata* (Chamisso and Eysenhard, 1821)
21. *Euapta godeffroyi* (Semper, 1868)
22. *Opheodesoma grisea* (Semper, 1868)
23. *Synaptula recta* Semper, 1868
24. *Polycheira rufescens* (Brandt, 1835)

Key to the Genera, Subgenera and Species

**Family** HOLOTHURIDAE
**Key to genera**

1. Spicules: abundant branched rods, usually dichotomously lobed rods if present occur always in combination with tables ..................................................... 2
   Spicules: tables present in most forms, buttons, rods, rosettes; perforated plates may or may not be present; dichotomously lobed rods if present occur always in combination with tables..................................................... 3

2. Spicules: Anus guarded by five calcified papillae or anal teeth No calcified anal teeth, but smaller papillae may be present.......................... *Actinopyga*
   No calcified anal teeth, but smaller *papillae* may be present ............ *Bohadschia*

3. Podia restricted to the ambulaeral areas only ...................... *Labidodemas*
   Podia in the form of locomotory pedicels on ventral surface, which is often flattened and more or less sensory conical papillae on the dorsal surface which is arched .......................................................... *Holothuria*

**Genus** *Actinopyga*
**Key to species**

1. Spicules: elongate, irregularly shaped rods having many small processes along their sides, variable dichotomous shaped small rosettes .................*mauritiana*
   Spicules: no elongate or branched rod but rosettes, stem of which are widely spread; those of the skin are short and have slight protruberences at sides and ends ........................................... *miliaris*
Genus Holothuria

Key to subgenera

1. Spicules: tables present along with rods and rosettes but never with buttons or pseudobuttons ................................................................. 2
   Spicules: tables present in combination with buttons or pseudobuttons, but never with rods or rosettes .............................................. 3

2. Spicules: tables present with rosettes, but no rod ...................... Halodeima
   Spicules: tables present with rods but no rosette ...................... Semperothuria

3. Spicules: tables with smooth rim; but tons regular ......................... 4
   Spicules: tables with spinose rim, buttons irregular twisted or modified ........ 5

4. Spicules: tons regular, thin, flat, with three to six pairs of small holes and with an apparent median longitudinal ridge .................. Platyperona
   Spicules: buttons not thin or flat with three pairs of large smooth and parallel holes but without any median longitudinal ridge ........ Thymiosycia

5. Spicules: buttons irregular, sometimes incomplete though not twisted and usually with three pairs of holes .................. Mertensiothuria
   Spicules: buttons irregular often incomplete, twisted or knobbed ............ 6

6. Spicules: buttons twisted as pseudo buttons but never modified into fenestrated ellipsoids ....................................................... Lessonomothuria
   Spicules: buttons either simple with regular knobs or modified into hollow fenestrated ellipsoids ............................................ Microthele

Genus Holothuria

Sub-genus Mertensiothuria

Key to species

1. Spicules: tables reduced, buttons often are represented as knobbed bars ........ Holothuria (Mertensiothuria) pervica
   Spicules: tables well developed, buttons smooth, irregular but never knobbed.... 2

2. Spicules: buttons complete or incomplete with two long narrow holes on two sides and two small round holes at upper and lower ends ........ Holothuria (Mertensiothuria) fuscocinerea.
   Spicules: buttons variously developed, regular to almost irregular and twisted with three pairs of unequal holes ....... Holothuria (Mertensiothuria) leucospiliota
Sub-genus **Thymiosycia**

**Key to species**

1. Spicules: tables with disc smooth and eight peripheral holes, buttons with smooth outline and three pairs of large, smooth, uniform and parallel holes ........

   

   ..........................\*Holothuria (Thmiosycia) impatien\*

   Spicules: tables wide having disc with more than eight peripheral holes; buttons with irregular outline and holes small or large .......................... 2

2. Spicules: table disc having upto 10 peripheral holes; button with larger holes .....  

   ..........................\*Holothuria (Thmiosycia) hilla\*

   Spicules: table disc having numerous holes and smooth wavy ends; but tons oval with three pairs of smaller holes .......................... \*Holothuria (Thmiosycia) arenicola\*

**Family** **STICHOPODIDAE**

**Key to genera**

1. Spicules: reduced; no table, only grains and dichotomously star-like rods, never ‘S’ or ‘C’ shaped..........................\*Thelenota\*

   Spicules: include tables, branched rods and ‘S’ and ‘C’ shaped rods ....\*Stichopus\*

**Genus** **Stichopus**

**Key to species**

1. No rosette among calcareous deposits; table disc smooth with four to eight holes; ‘C’ shaped bodies found deep in the skin..........................\*chloronotus\*

   Rosettes always present; table disc irregular with a circle of small peripheral holes, often incomplete; big C shaped rods, three to five times the diameter of table disc..........................\*variegatus\*

**Family** **SYNAPTIDAE**

**Key to genera**

1. Spicules: stock of anchors irregularly branched.......................... 2

   Spicules: stock of anchors unbranched.......................... 3

2. Spicules: anchor plates not abruptly contracted at the posterior end but with large hole on each side..........................\*Euapta\*

   Spicules: anchor plates abruptly contracted at the posterior end and having no large smooth holes on each side..........................\*Opheodesoma\*
3. Spicules: Characteristically large anchors, anchor plates sub-rectangular, broad posteriorly with numerous smooth holes. .......................................................... Synapta
Spicules: Anchor size variable, but never particularly large, anchor plates rounded anteriorly and narrowing posteriorly with a few toothed holes arranged regularly. .......................................................... Synaptula

SYSTEMATIC ACCOUNT

Class HOLOTHURIOIDEA
Order ASPIDOCHIROTIDA
Family HOLOTHURIIDAE
Genus Actinopyga Bronn, 1860

1. Actinopyga mauritiana (Quoy & Gaimard 1833)
Material: Androth island - 6 specimens
Description: Tentacles 25; size highly variable (45-100 mm.) colour chocolate brown dorsally, whitish ventrally; anus characteristically with 5 calcified teeth; spicules consisting of bluntly spinose slender rods and rosettes.
Remarks: This species was first recorded from Lakshadweep by Koehler and Vaney (1908)
Distribution: Andaman, Nicobar and Minicoy islands in India and throughout the Indo-west pacific region.

2. Actinopyga miliaris (Quoy & Gaimard, 1833)
1971. Actinopyga miliaris : Clark and Rowe, Monog. Indo-west Pacific Echinod., 176
Remarks: This species was first recorded by James (1969) based on material from the Minicoy island. specimens are normally robust, with pedicals arranged in three distinct rows ventrally; spicules composed of numerous tiny rosettes, x-shaped rosettes with dichotomous bifurcations and spinose rods; commercialised for Beche-de-mer.
Distribution: Widely distributed in tropical Indo pacific region.

Genus Bohadschia Jaeger, 1833

3. Bohadschia marmorata Jaeger 1833
1833. Bohadschia marmorata Jaeger De Holothuris. Turici : 18, pl.3 fig. 9
Material: Kavaratti island - one specimen
Description: Tentacles 18; size 75 mm. Pedicles and papillae scattered over body
surface; mouth ventral; colour cream-yellow with blackish patches in the dorsal surface, no anal papilla; spicules consisting of dichotomously branched rods and grains, no table or button.

**Remarks**: This species was first recorded by James (1969) based on material from the Minicoy island.

**Distribution**: Minicoy, Andaman Is; Tuticorin in India and the tropical, Indo-west pacific area except island of west Indian Ocean, S.E. Arabia, Persian Gulf, Pakistan and Maldives.

**Genus**  *Holothuria* Linnaeus, 1767

**Subgenus**  *Halodeima* Pearson, 1914

4. *Holothuria (Halodeima) atra* Jaeger, 1833


**Material**: Kavaratti island - 7 specimens

**Description**: Tentacles 20; size small to moderate 45-170 mm; pedicels form a sole ventrally; spicules characterised by complete absence of buttons, tables with reduced disc and numerous rosettes.

**Remarks**: This species was first recorded by Nagabhushanam and Rao (1972) from Minicoy Island.

**Distribution**: Andaman, Nicobar, Krusadai islands, Mandapam and Tuticorin in India and Indo-west pacific area except Mascarene Islands.

**Subgenus**  *Lessonothuria* Deichmann, 1958

5. *Holothuria (Lessonothuria) pardalis* Selenka 1867


**Material**: Kiltan island 4 specimens.

**Description**: Tentacles 17-20 with tentacular collar; size 90-100 mm; light brown in colour, spotted; pedicels make a flattened ventral sole; spicules consisting of tables with spinoce disc, rim of disc upturned, pseudo buttons numerous with a single row of 3-4 holes, regular buttons are a few.

**Remarks**: This species was first recorded by James (1969) based on the material from Chetlat and Minicoy Islands.

**Distribution**: Minicoy, Chetlat islands, Krusadai island, Gulf of kutch and Port Okha in India, and cricumtropical.
6. Holothuria (Mertensiothuria) leucospilota (Brandt, 1835)

1835. Stichopus (Gymnochirota) leucospilota Brandt. Prodromus descriptions animalium ab H
Mertensio in orbis terrarum circumnavigatione observatorum Petropoli, 1 : 51.
India, 81 : 305.

Material: Androth island - one specimen; Kalpeni island - one specimen, Admini
island - one specimen.

Description: Tentacles 20; size small to moderate 40-150 mm; pedicels form a
sole like surface ventrally; cuverian organs found in material from Kalpeni island;
spicules consisting of table with spinose disc with variable arrangements of peripheral
holes; buttons are sometimes incomplete and irregular.

Remarks: This species was first recorded from Lakshadweep by Koehler and Vaney
(1908) in the name of Holothuria vagabunda.

Distribution: Andaman Kilakarai, Tuticorin, Vizhingam, Karwar, Kiltan island in
India. A very common species of the Indo-pacific area.

7. Holothuria (Mertensiothuria) fuscocinerea Jaeger, 1833

1833. Holothuria fuscocinerea Jaeger De Holothuris. Turici : 22
India, 81 : 304.

Material: Androth island - one specimen

Description: Tentacles 20; size very small 35 mm; each pedicel is surronded by a
white rim, papillae are situated on warty prominences, each row is surronded by a broad
blackish area which by joining with dark area of the other papillae form a transverse
band, thus the dorsal surface appears to have blackish patches; spicules consisting of
tables with smooth disc and with four larger and four smaller holes alternately arranged;
buttons have a central axis from which are given of on each side three to six outgrowths
and thus each button appears to have lost their outer wall.

Remarks: This species was first recorded by the author (1983) from the Androth
Island.

Distribution: Ranges from Sri Lanka, Australia, Navigator Is, Philippines to
Panamic region.

8. Holothuria (Mertensiothuria) pervicax Selenka, 1867

1867. Holothuria pervicax Selenka. Z. wiss. zool. 17 : 327, pl. 8, fig.54.
1971. Holothuria (Mertensiothuria) pervicax: Clark and Rove, Monogr. Indo-west-Pacific
Echinod., 176.

Description: Each dorsolateral interambulacrum with irregular series of low
tubercles surronded by dark brown papillae encircled with lighter ring at base; spicules
include tables with oval to squarish disc, spine often reduced to one rod, buttons with
pairs of small and large holes.
Remarks: This species was first recorded and listed by James (1969) based on material from the Minicoy Island.

Distribution: Minicoy Island in India and throughout the tropical Indo-Pacific littoral area except Persian Gulf, Pakistan, Ceylon, China and S. Japan.

Subgenus Microthele Brandt, 1835

9. Holothuria (Microthele) nobilis Selenka 1867

1971. Holothuria (Microthele) nobilis: Clark and Rove, Monogr. Indo-west-Pacific Echinod., 178

Description: Body cylindrical with five large protruberences along each ventrolateral ambulacrum. Ventral mouth; spicules include hollow fenestrated ellipsoids and numerous knobbed buttons.

Remarks: This species was first recorded by James (1969) based on material from the Minicoy Island.

Distribution: Indopacific.

Subgenus Platyperona Rowe, 1969

10. Holothuria (Platyperona) difficilis Semper 1868


Material: Kavaratti island - 10 specimens; Androth island - one specimen.

Description: Tentacles 18-20 with tentacular collar, size small 15-50 mm; colour deep brown to almost blackish; spicules comprises of well developed tables with smooth disc with 6-15 peripheral holes, buttons thin, flat with prominent edge and 3-6 pairs of linear holes of various sizes having an apparent longitudinal ridge in the middle.

Remarks: These specimens usually occur in rock pools under dead coral rocks individually during bright light but in aggregation during twilight. Recorded first by James (1969) from Minicoy island.

Distribution: Andaman and Minicoy islands in India and throughout the tropical Indopacific area.

Subgenus Semperothuria Deichmann, 1958

11. Holothuria (Semperothuria) cinerascens (Brandt 1835)


Material: Androth island - 4 specimens; Kalpeni island - one specimen.
MUKHOPADHYAY: Holothuroidea

Description: Tentacles 18; size small 90-100 mm; pedicels arranged closely on the ventral side leaving a small bare area in the middle; papillae scattered and light yellow in colour; spicules consisting of spiny rods and small tables, rods are curved and highly spinous.

Remarks: This species was first recorded by James (1969) based on material from Minicoy island.

Distribution: Andaman, Mandapam and Vizhingam in India and throughout the Indowest Pacific area except Persian Gulf.

Subgenus Thymiosycia, Pearson, 1914

12. Holothuria (Thymiosycia) hilla Lesson, 1830


Material: Kavaratti island - 3 specimens; Amini island - one specimen

Description: Tentacles 18; size small 25-50 mm; vermiform; body wall thick; anus surrounded by a ring of papillae; ground colour is brown with canary yellow spots of papillae and pedicels; spicules consisting of tables with smooth oval disc having 8-12 peripheral holes, buttons with 3-6 pairs of large holes of various sizes.

Remarks: This species was first recorded by Kochler and Vaney (1908) as Holothuria monacaria. Specimens lie freely exposed on dead coral bed.

Distribution: Andaman and Krusadai islands, Kilakarai and Tuticorin. Common throughout the Indopacific area.

13. Holothuria (Thymiosycia) impatiens Forskal, 1775

1775. Fistularia impatiens Forskal. Descriptiones animalium quae in itinere orientali observavit P. Forskal. Hauniue: 121, pl.39, fig. 3.

Material: Androth island - one specimen

Description: Tentacles 20 with tentacular collar; size 124 mm; anus guarded by a circle of anal papillae; colour creamy white with a few violet colour bands prominent on the ventral side; spicules consisting of tables with squarish disc with characteristically light, smooth, large peripheral holes and buttons with three pairs of large, smooth and parallelly arranged holes, rods bilobed and perforated at ends, spicule surfaces appear polished.

Remarks: The specimen was found concealed under coral rocks covered by algal growth. First recorded by James (1969) on material from the Minicoy island.

Distribution: Andaman, Minicoy islands in India and circumtropical Indopacific.
14. Holothuria (Thymiosycia) arenicola Semper, 1868


**Material**: Amini island 2 specimens.

**Description**: Tentacles 20; size moderate, 110 mm; cylindrical; colour orange red; pedicels and papillae scattered over the whole body surface; cuvierian organs present, spicules consisting of tables with 4-8 peripheral holes, buttons smooth with three pairs of minute holes.

**Remarks**: This is the first record of the species from the Lakshadweep.

**Distribution**: Andaman island, Bay of Bengal in India and throughout the tropical Indopacific area.

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Genus Labidodemas Selenka, 1867

15. Labidodemas rugosum (Ludwig 1875)


**Material**: Kavaratti island - 2 specimens

**Description**: Tentacles 20; size 30 and 80 mm; tentacles totally absent in the smaller specimen; double central row of pedicels and papillae in six rows; body vermiform with soft leathery body wall; spicules consisting of tables with a dozen peripheral holes in the disc, disc and top of the spire is highly spinous; spines on top are bifid, buttons totally absent.

**Remarks**: This species was first recorded from these islands by the author (1983).

**Distribution**: Bay of Bengal and Andamans in India and throughout the Indopacific littoral waters from Maldive to Hawaiian islands.

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Family STICHOPODIDAE

Genus Stichopus Brandt, 1835

16. Stichopus chloronotus Brandt, 1835


**Material**: Kiltan island - one specimen

**Description**: Medium sized specimens 150 mm long; elongate and quadrangular body tapering at ends; dorso and ventrolateral ambulacral angles with double rows of conical papillae alternately arranged; colour almost black; spicules composed of tables, ‘C’ shaped rods and a few rosettes. No commercial value.

**Remarks**: This species was first recorded by James (1969) based on material from the Chetlat island.
Distribution: Andaman, Nicobar and Krusadai Islands in India and littoral waters of Indopacific Oceans.

17. *Stichopus variegatus* Semper, 1868


Remarks: This species was first recorded by Nagabhusanam and Rao (1972) based on material from the Minicoy island. Specimens of this species may go up to a length of 900 mm, average being 200 mm; usually quadrangular in shape with tapering ends; spicules include tables, rosettes, ‘C’ shaped rods and supporting rods.

Distribution: Andaman, Minicoy islands in India and the Indo-pacific region.

Genus *Theleomata* Clark, 1921

18. *Theleomata ananas* (Jaeger, 1833)


Description: The specimens are of bigger sizes, up to 400 mm; body subquadrangular, mouth ventral; papillae large, conically compressed with their bases united together forming semistar like appendages; species consisting of dichotomously branched rods and numerous minute oval grains, some rods are smooth, curved at ends, used extensively for commercial purpose.

Remarks: This species was first listed by James (1969) based on the material from Minicoy island.

Distribution: Minicoy island in India and sporadically in the Indo-west pacific area from maldive to S. Japan.

Order DENDROCHIROTIDA

Family PHYLLOPHORIDAE

Genus *Afrocucumis* Deichmann, 1944

19. *Afrocucumis africana* (Semper, 1868)

1868. *Cucumaria africana* Semper, *Holothurien. risen im Archipel der philippinen* 2. wissenschaftliche Resultate Weisbaden. 2 (1) : 153, pl. 15, fig. 16


Description: These are small specimens measure about 50 mm in length and a typical cucumarid; spicules characterised by large lenticulate perforated plates where perforations almost or completely obliterated and big rods with holes at both ends.

Remarks: This species was first recorded by James (1969) based on material from the Minicoy Island.

Distribution: Lakshadweep and Bay of Bengal in India, common in Indo-west pacific area except Red Sea, Persian Gulf, Pakistan, Ceylon and Philippines.
Order APODIDA
Family SYNAPTIDAE
Genus Synapta Eschscholtz, 1829

20. Synapta maculata (Chamisso and Eysenhardt, 1821)


Material: Kavaratti island - one specimen.

Description: Tentacles 15; size 900 mm. snake like elongated body longitudinally banded; spicules consisting of huge anchors with anchor plates, arm and base of anchor smooth, anchor plates quadrangular with a number of large smooth holes.

Remarks: This species was first recorded from Lakshadweep by Koehler and Yaney (1908) as Chondrocloea baselli.

Distribution: Andaman islands and almost throughout the whole Indo-pacific area.

Genus Euapta Ostergren, 1898

21. Euapta godeffroyi (Semper 1868)


Description: Tentacles 15-16 with upto 40 pairs of digits; numerous polian vesicles stone canal present; spicules consisting of small anchors with the pillar twice as the arm, anchor plates narrowed posteriorly and miliary granules nearly spherical or discoidal.

Remarks: This species was first reported by James (1969) based on the material from Minicoy island.

Distribution: Mascarene island, Red Sea, Lakshadweep, Maldives East Indies, North Australia, Philippine is., South Pacific is. and Hawaiian islands.

Genus Opheodesoma Fisher, 1907

22. Ophendesoma grisea (Semper, 1868)


Material: Kiltan island - one specimen

Description: Tentacles 15; size 130 mm; slender, body wall thin and rough to touch due to underlying calcareous particles; colour dark green with irregular longitudinal lighter strips with numerous minute white specks; polian vesicles and stone canals numerous; spicules; small anchors and anchor plates, anchor plates abruptly contracted posteriorly thus lacking a large smooth hole on each side, stock of anchors irregularly branched.
Remarks: This is the first record of the species from the Lakshadweep.

Distribution: Lakshadweep, Bay of Bengal in India; East Africa, Red Sea, S.E. Arabia, East Indies, North Australia and Philippine Islands of the Indo-west pacific area.

Genus Synaptula Oersted, 1849

23. Synaptula recta (Semper, 1868)


1971. Synaptula recta : Clark and Rowe, Monogr. Indo-west Pacific Echinod. 188.

Material: Kavaratti island - specimens

Description: Tentacles 10-13; size very small 50 mm; worm like, light brown to yellowish in colour; body wall rough to touch; spicules consisting of anchor plates and anchor plates with toothed holes, tapering posteriorly, anchors small, milky granules numerous appearing like minute oval grains.

Remarks: This is the first record of the species from Lakshadweep.

Distribution: Lakshadweep, Andaman is.; Bay of Bengal in India, and Islands of west Indian Ocean, East Africa and Madagascar. Also from Ceylon to S. Pacific islands of the Indo-west pacific area.

Family CHIRIDOTIDAE

Genus Polycheira Clark, 1907

24. Polycheira rufescens (Brandt 1835)


1981. Polycheira rufescens : Clark and Rowe, Monogr. Indo-west Pacific Echinod., 188.

Material: Minicoy - 2 specimens

Description: Tentacles 18, peltatodigitate; size 150 mm. soft body with very thin, transparent body wall; calcareous ring consists of 18 pieces; spicules consisting of wheels and sigmoid bodies, wheels with spokes arranged regularly, number of spokes normally 5; sigmoid bodies smooth, blunt and rounded at ends.

Remarks: This is the first record of the species from the Lakshadweep.

Distribution: Lakshadweep, Andaman is.; Bay of Bengal in India, and Islands of west Indian Ocean, East Africa and Madagascar. Also from Ceylon to S. Pacific islands of the Indo-west pacific area.

GENERAL REMARKS

These islands provide different habitats of varying physical condition which include mangrove swamp, sandy floor, coral beds, shingles and boulders, scattered reef, surf zone and surge channels, landward caverns and ledges, tide pools etc., for colonisation of holothurians. The reef area is alternately exposed and sub-merged by ebb and flood tides, respectively, while the lagoons proper have very little tidal fluctuations.
The most conspicuous and abundant holothurians of Lakshadweep coral reef and the thick walled aspidochirotids, *Holothuria (Halodeima) atra*, *H. (Mertensiothuria) leucospilota*, *H. (Platyperona) difficile* and *Actinopyga mauritiana* occurring in abundance in the midlittoral zone of the coral rocky beds of Androth and Kavaratti islands. At Minicoy lagoon, the giant-sized *Thelenota ananas* was found freely exposed. Less common forms are *H. (Semperothuria) cenirascens*, *H. (Thymiosycia) hilla*, *H. (Mertensiothuria) fuscocinerea*, *Bohadschia marmorata*, *Labidodemas rugosum* and *Synapta maculata*.

**SUMMARY**

Littoral holothurians hitherto known from Lakshadweep comprising 24 species under 12 genera and 5 families are dealt with in this paper. Of them, 4 species are new records for these islands. A list of holothurians recorded from Lakshadweep, with keys for their identification is also given.

**ACKNOWLEDGEMENTS**

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**REFERENCES**


ADDENDUM

After this account has gone to the press an important and relevant publication of D.B. James (1989) entitled "Echinoderms of Lakshadweep and their Zoogeography" appeared in Bull. Cent. mar. Fish. Res. Inst., 43 : 97-144. As no major change can be incorporated at this stage, important information is included below:

SPECIES ADDITIONALLY REPORTED


   Remarks: *Actinopyga* having rare occurrence with fewer number of tentacles and large and richly branched rods along with dichotomously branched rosettes.

   Distribution: Lakshadweep (Amini Island); Andaman & Nicobar Islands and from western Indian Ocean to South Pacific Islands.


   Remarks: A very common species, differs from other species i.e., *Bohadschia marmorata* in having colour of the body brown or purplish brown with eye-like spots all over the body. Though used commercially but of the poor grade of Beche-de-mer.

   Distribution: Lakshadweep (Chetlat, Kiltan, Kadmat, Amini, Agatti and Kavaratti Islands); Bay of Bengal; Andaman & Nicobar Islands; Islands of the Western Indian Ocean; Sri Lanka area; East Indies; North Australia; Philippines; China and South Japan and South Pacific Islands.


   Remarks: Most thick-walled and less active holothurian with balckish white patches all over the body; body wall gritty to touch; spicules are characteristically knobbed.

   Distribution: Lakshadweep (Kiltan); Andaman & Nicobar Islands; Maldives; Mascarene Island; East Africa and Madagascar; Red Sea; East Indies and North Australia; Philippines and South Pacific Islands.


   Remarks: Tentacles 20, arranged in two circles, outer having 15, larger and inner 5 smaller; anus with 5 groups of anal papillae; spicules having tables with low spire terminating in ring of short spines; burrowing in habit.

   Distribution: Lakshadweep (Chetlat, Amini, Agatti and Androth); Andamans; East Indies, China and South Japan.

SPECIES NOT DEALT WITH

1. *Holothuria (Mertensiorthuria) fusco-cinerea* Jaeger, 1833  
2. *Synapiula recta* Semper, 1868  