

# **FAUNA OF LAKSHADWEEP**



**ZOOLOGICAL SURVEY OF INDIA  
1991**



# FAUNA OF LAKSHADWEEP

*Edited by*  
*Director, Zoological Survey of India*



सत्यमेव जयते

ZOOLOGICAL SURVEY OF INDIA

1991

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# FAUNA OF LAKSHADWEEP

## C O N T E N T S

FAUNA OF LAKSHADWEEP : AN OVERVIEW <i>Ghosh A. K.</i>	1
LAKSHADWEEP : GENERAL FEATURES <i>Rao G., Chandrasekhara</i>	5
MEIOFAUNA <i>Rao G., Chandrasekhara</i>	41
ANNELIDA : POLYCHAETA <i>Misra A. and Chakraborty R. K.</i>	137
SIPUNCULA <i>Haldar, Badri Prasad</i>	167
ECHIURA <i>Haldar B. P. &amp; Datta Gupta A. K.</i>	185
CRUSTACEA : STOMATOPODA <i>Ghosh H. C.</i>	199
INSECTA : ORTHOPTERA <i>Hazra A. K., Dey A. &amp; Tandon S. K</i>	213
INSECTA : LEPIDOPTERA <i>Mandal D. K.</i>	217
INSECTA : ORTHOPTERA (ADDENDUM) <i>Bhowmik H. K. &amp; Sur S.</i>	257
INSECTA : DERMAPTERA <i>Srivastava G. K.</i>	259
INSECTA : DICTYOPTERA <i>Mukherjee K. P. &amp; Hazra A. K.</i>	263
INSECTA : DIPTERA <i>Parui P. and Datta M.</i>	265

INSECTA : MANTODEA <i>Mukherjee T K. &amp; Hazra A. K.</i>	267
INSECTA : COLEOPTERA <i>Biswas S. &amp; Mukhopadhyay P.</i>	269
MOLLUSCA <i>Surya Rao K. V. &amp; Subba Rao N. V.</i>	273
ECHINODERMATA : ASTEROIDEA, OPHIUROIDEA AND ECHINOIDEA <i>Sastry D. R. K.</i>	363
ECHINODERMATA : HOLOTHURIOIDEA <i>Mukhopadhyay S. K.</i>	399

## F O R E W O R D

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



## FAUNA OF LAKSHADWEEP : AN OVERVIEW

A. K. GHOSH

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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 Maldivian 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, Sipunculoidea,

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 1  
Fauna of Lakshadweep Recorded by ZSI

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

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 echninodermata 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 (*Erethmochelys 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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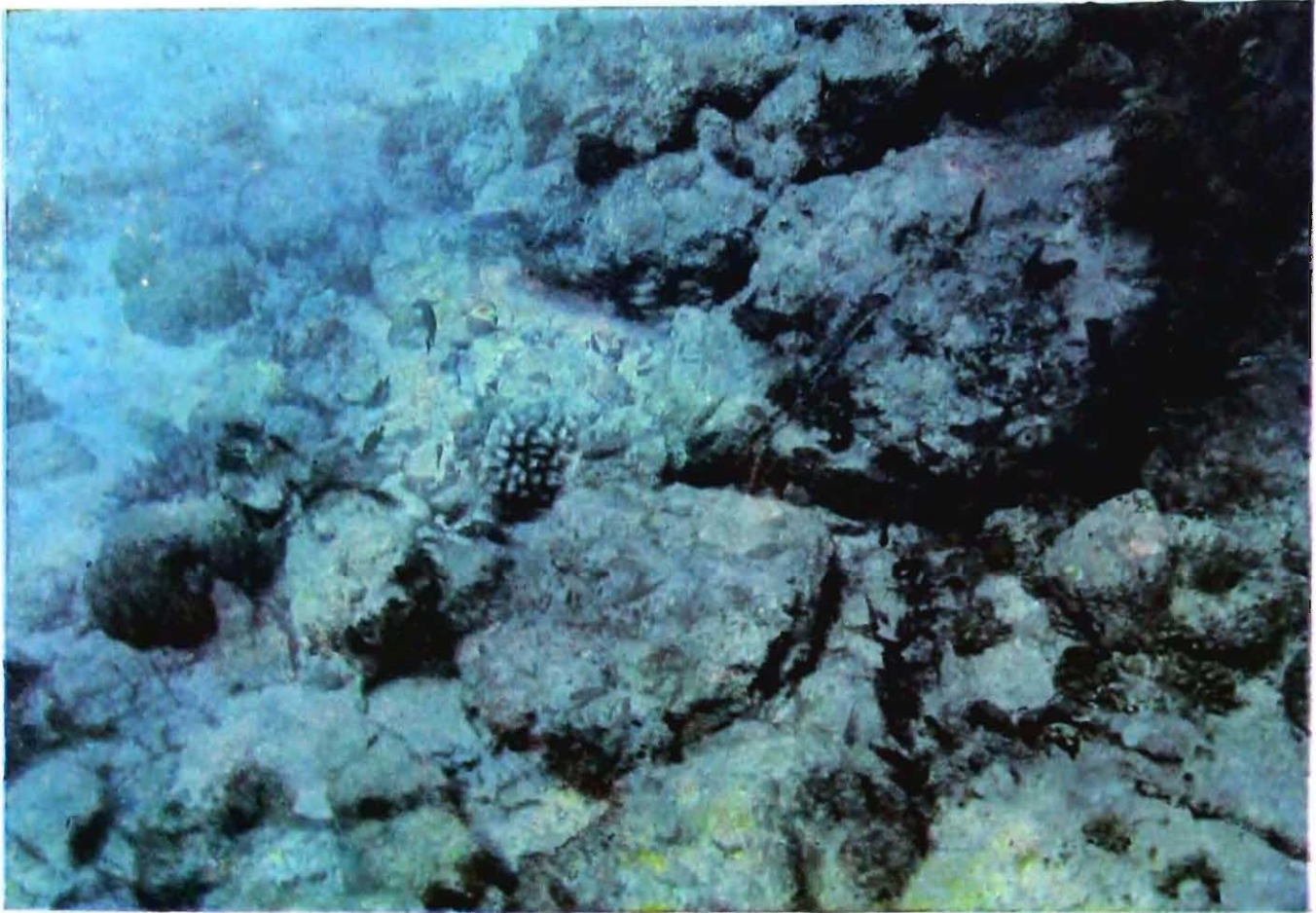


Ariel view of Kavaratti Island



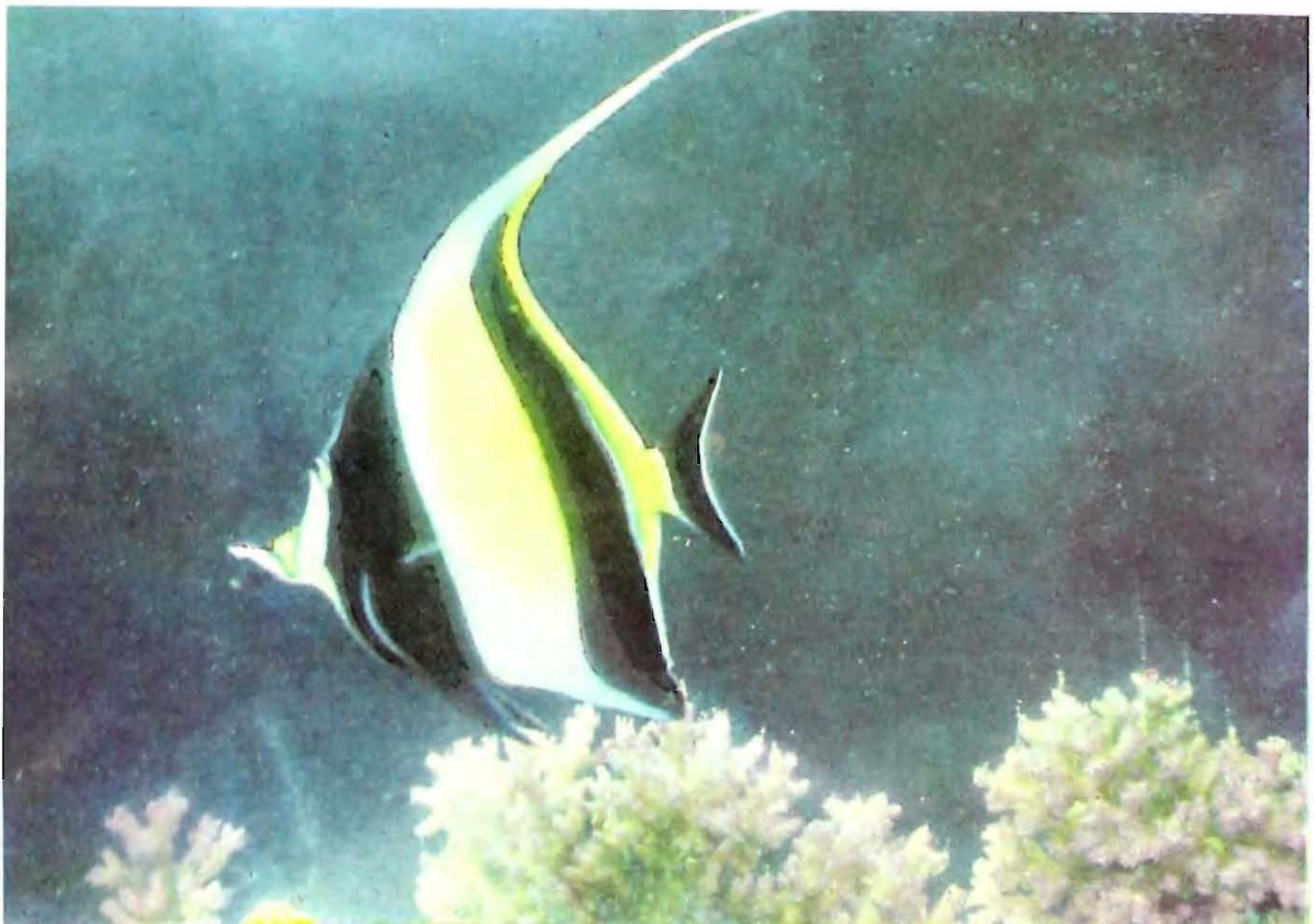
View from Coast

Courtesy : George Verghese



Coral beds

Courtesy : George Verghese



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

Courtesy : George Verghese



Coral-reef fishes, *Pterois miles* (Bennett)

Courtesy : George Verghese



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, Maldivic 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, Cheriyaakara, Valiyakara, Pitti, Kalpitti, Bangarum, Tinnakara Parli I, Parli II, Parli III, Cheriyaam, Kodithala, Tilakkam I, Tilakkam II, Tilakkam III, Pitti I and Pitti II. The remaining 9 reefs and sand banks include the Valiyapanniyam, Cheriapanniyam, Perumulpur, Elikalpeni, 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 bars 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, Maldivic 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

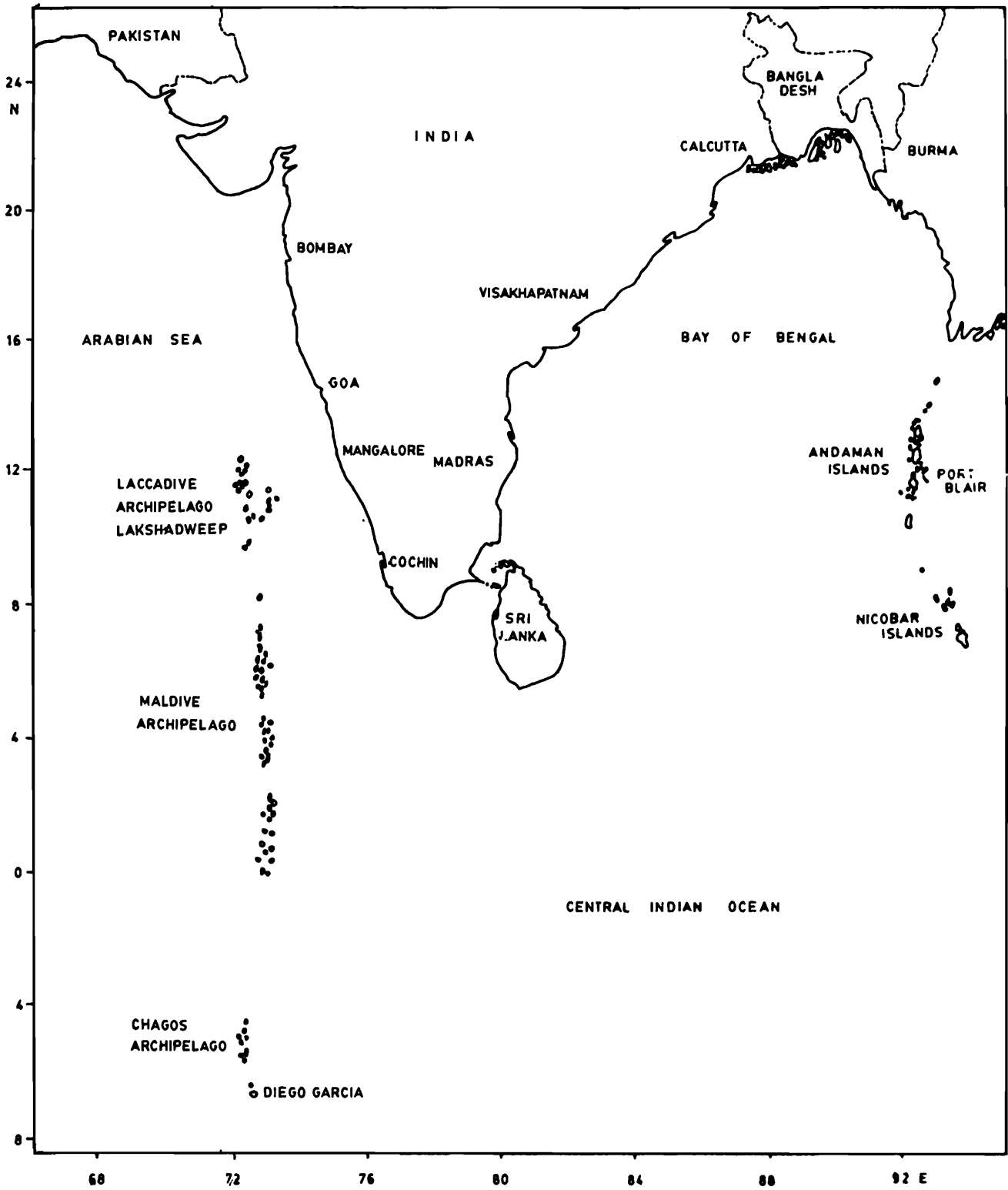


Fig. 1. Map showing the location of Laccadive, Maldive and Chagos archipelagos in the Central Indian Ocean.

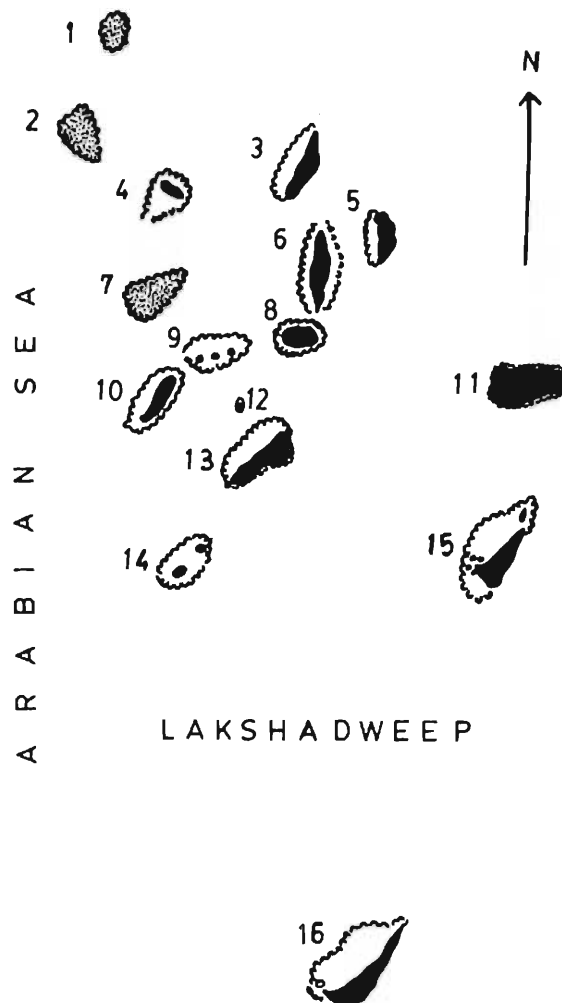


Fig. 2. Map showing the disposition of Lakshadweep in the South Arabian Sea  
 1. Valiyapanniyam reef, 2. Cheriyaapanniyam reef, 3. Chetlat, 4. Bitra,  
 5. Kiltan, 6. Kadmat, 7. Perumalpar, 8. Amini, 9. Bangaram, 10. Agatti,  
 11. Androth, 12. Pitti, 13. Kavaratti, 14. Suheli, 15. Kalpeni,  
 16. Minicoy.



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 submerged 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

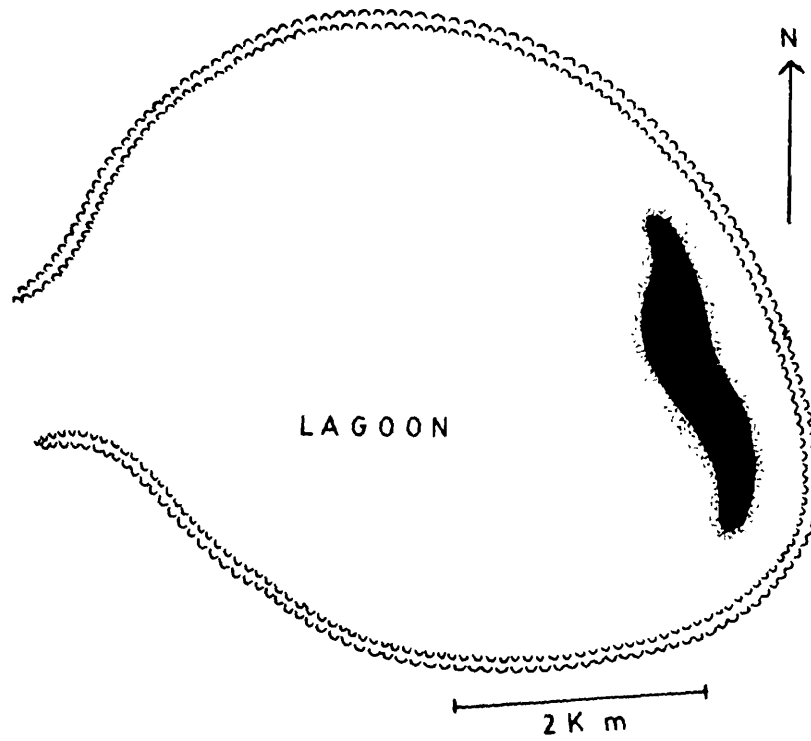


Fig. 4. Bitra Island

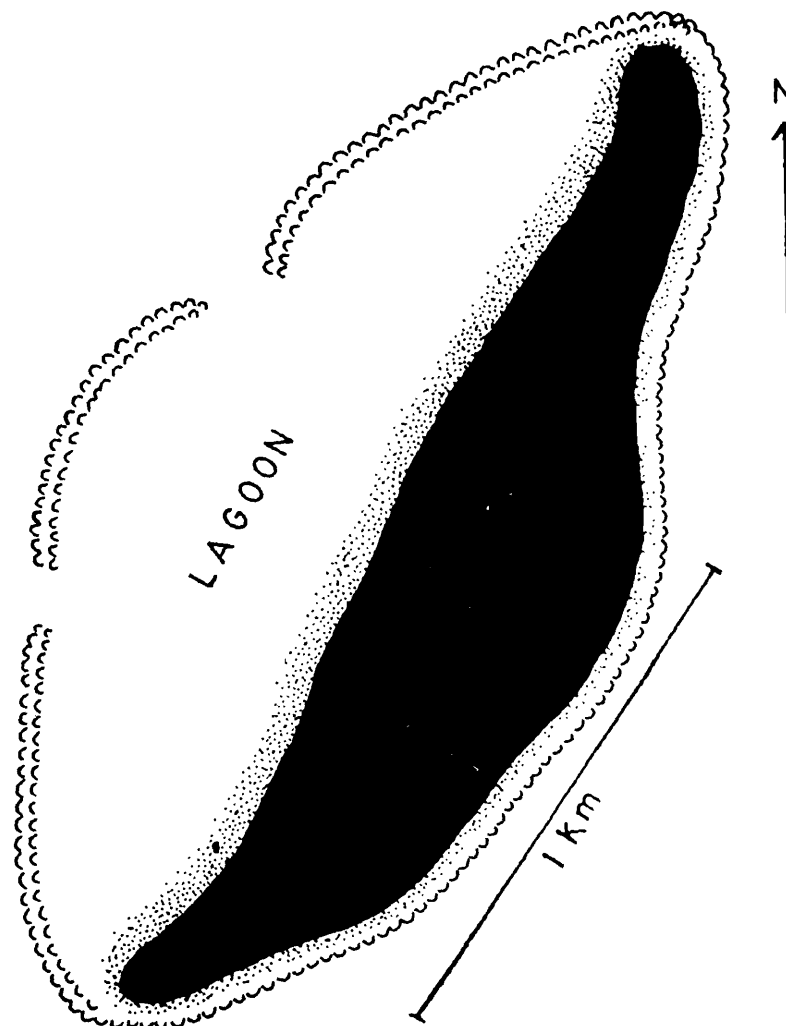


Fig. 5. Chetlat Island

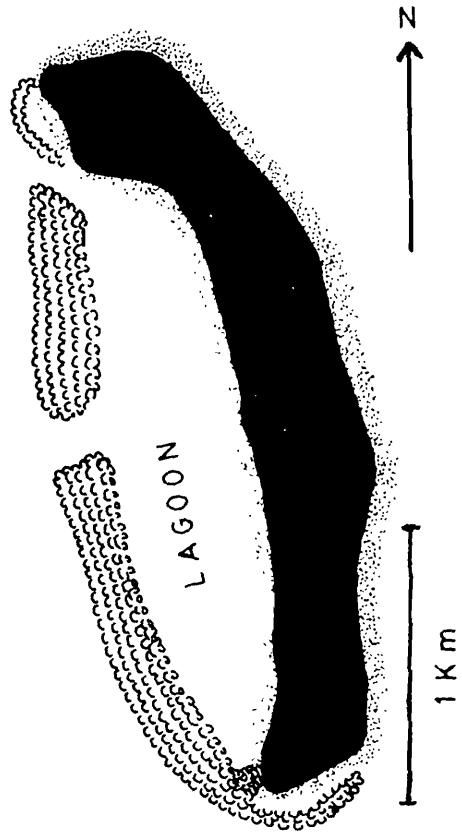


Fig. 6. Kiltan Island

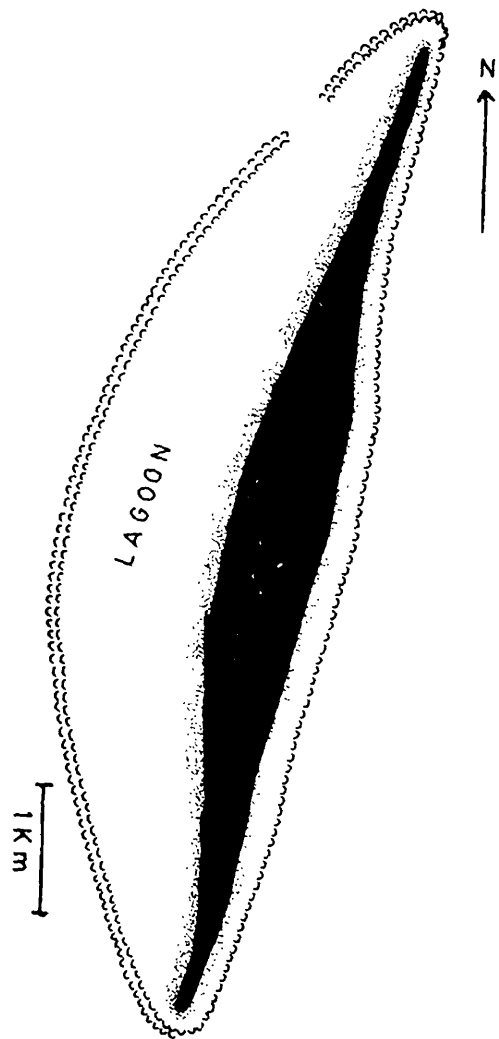


Fig. 7. Kadmat Island

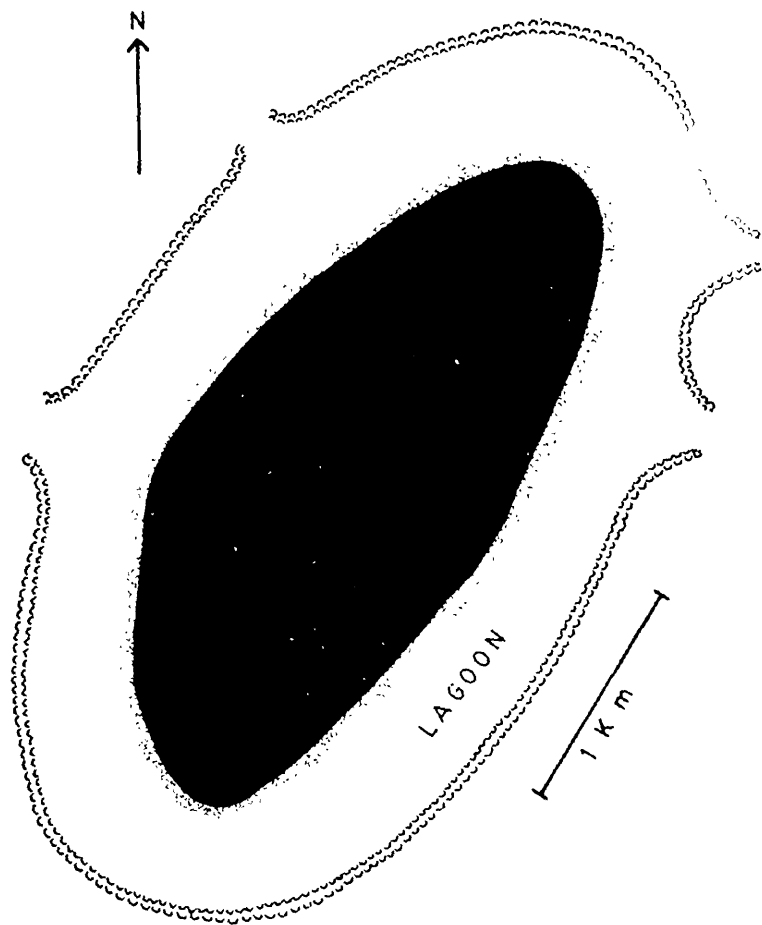


Fig. 8. Amini Island

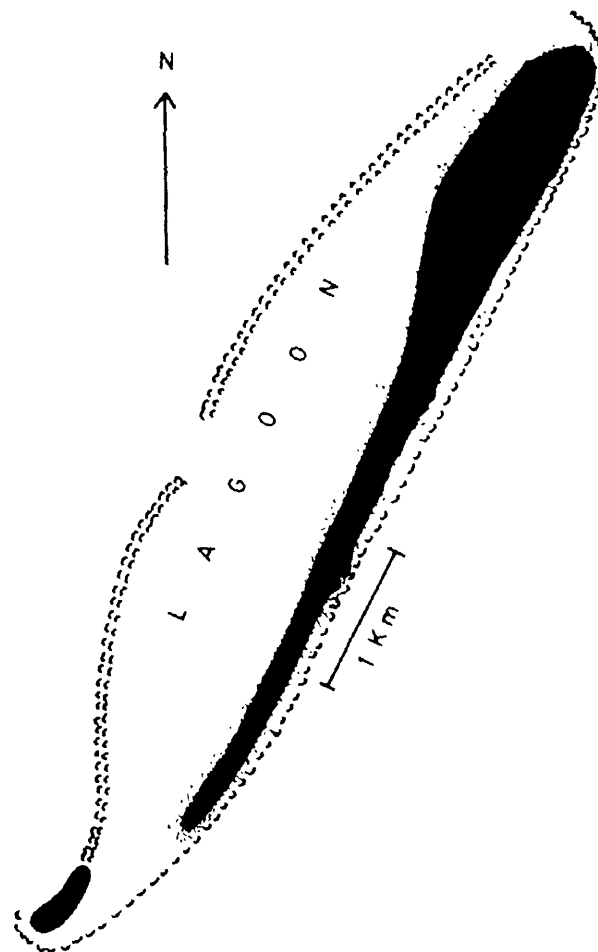


Fig. 9. Agatti Island and the uninhabited Kalpitti Islet

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

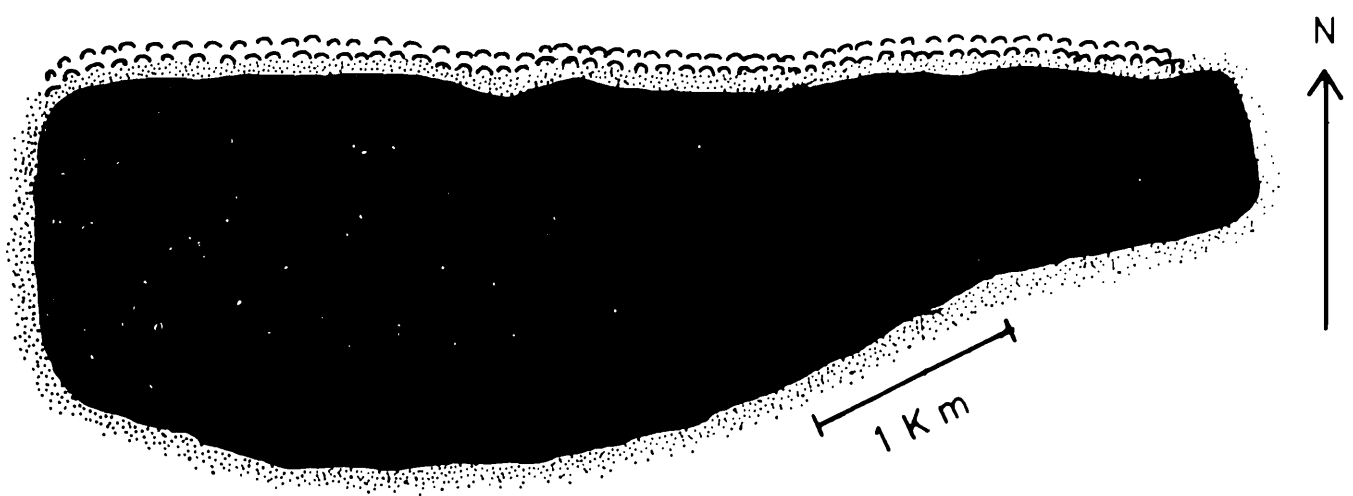


Fig. 10. Androth Island

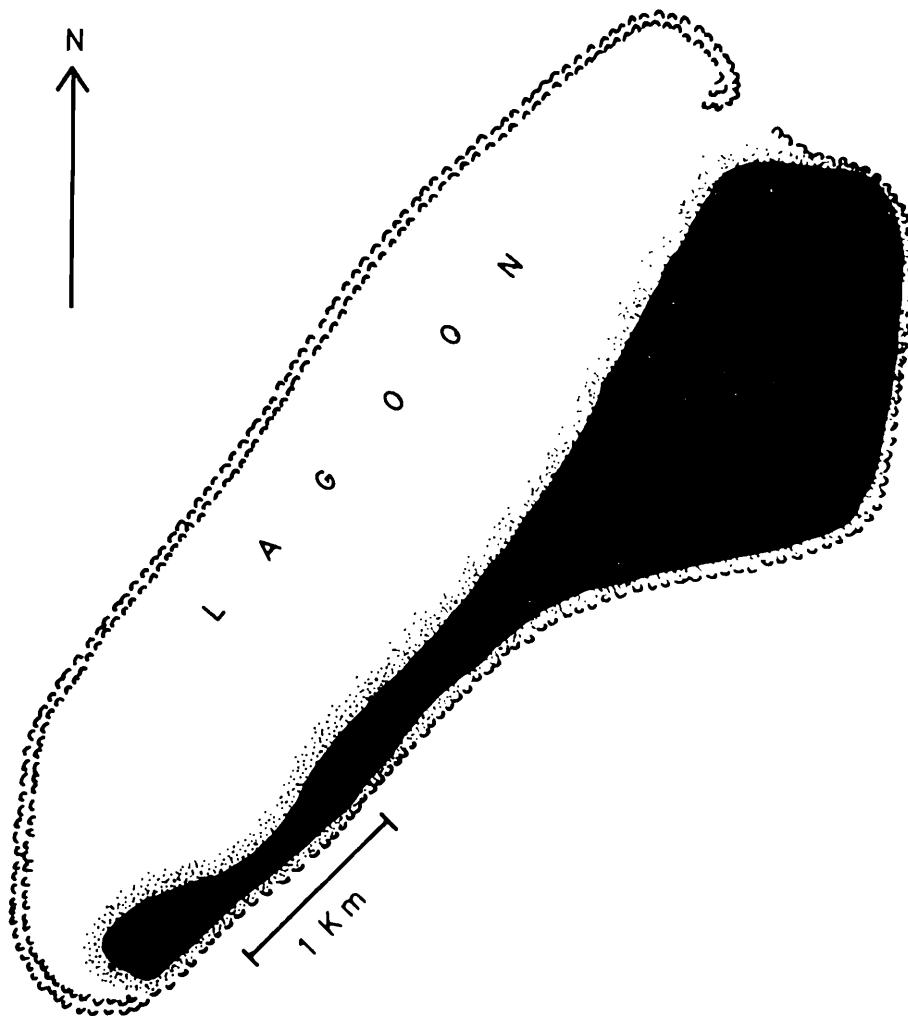


Fig. 11. Kavaratti Island

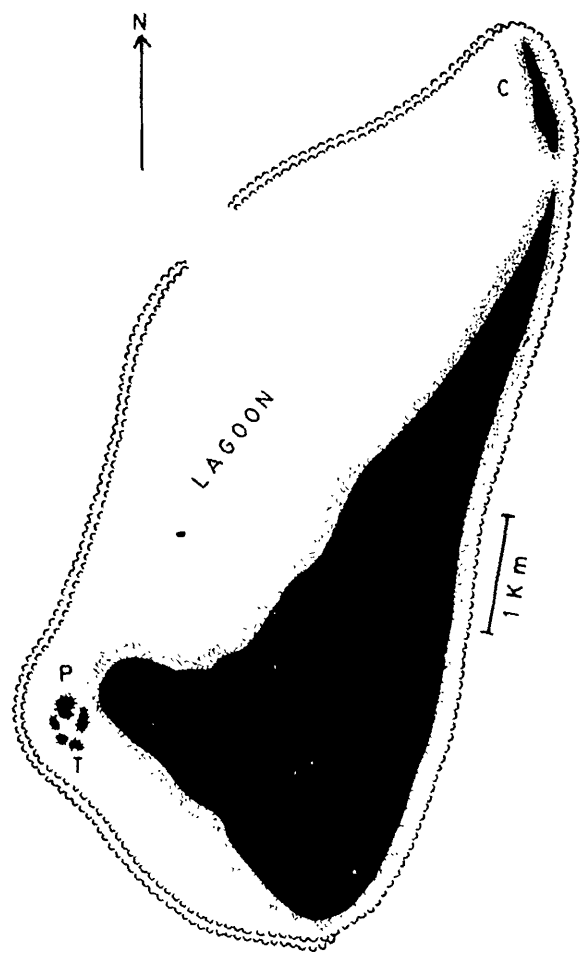


Fig. 12. Kalpeni Island and its islets

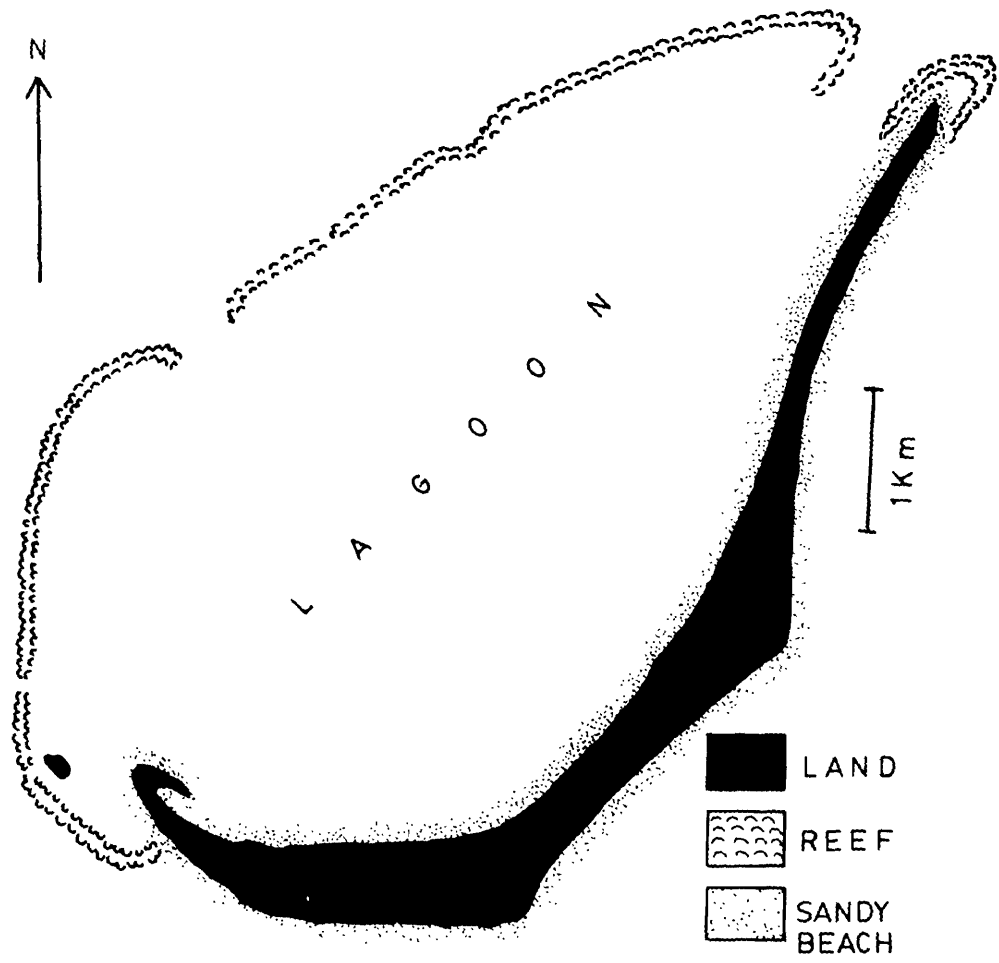


Fig. 13. Minicoy Island and the uninhabited Viringili Islet

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 Cheriyaakara and Valiyaakara (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, Cheriyaakara and Valiyaakara 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 Parali 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‰. 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

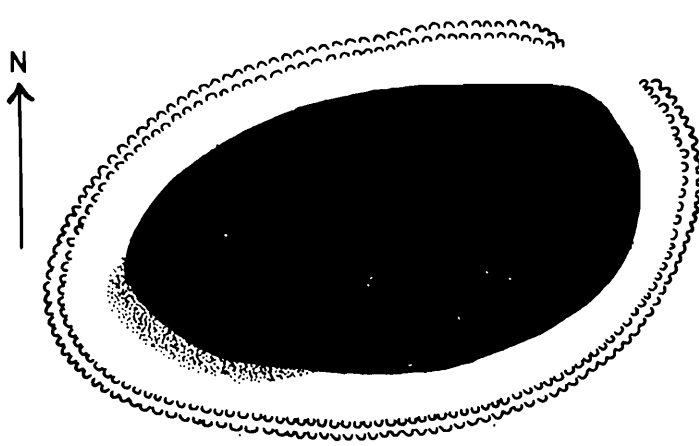


Fig. 14. Pitti Island

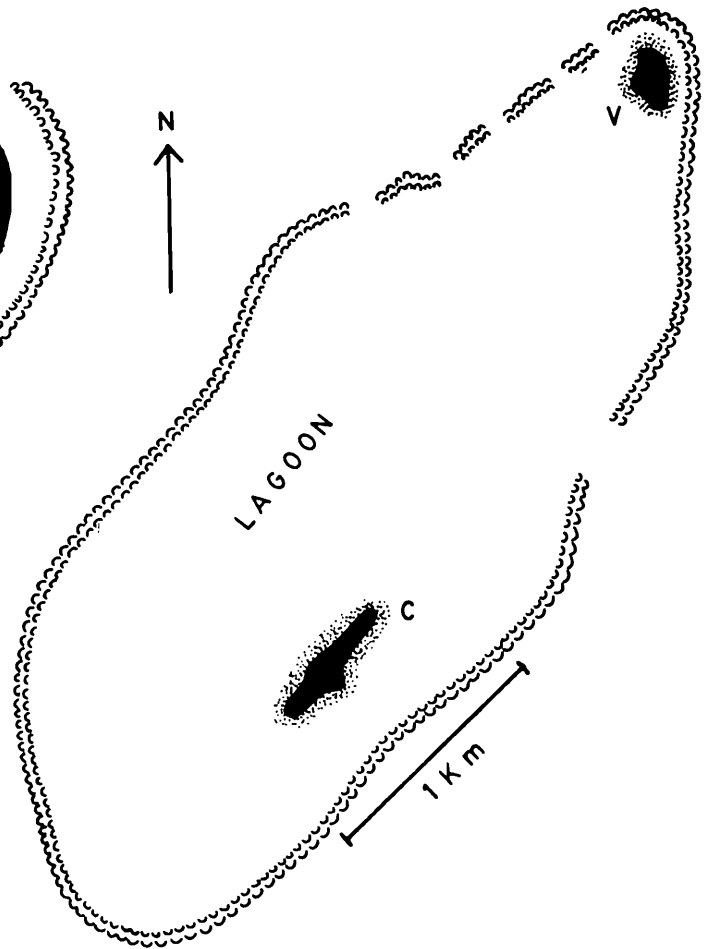


Fig. 15. Suheli Par showing the islet Cheriyakara and Valiyakara

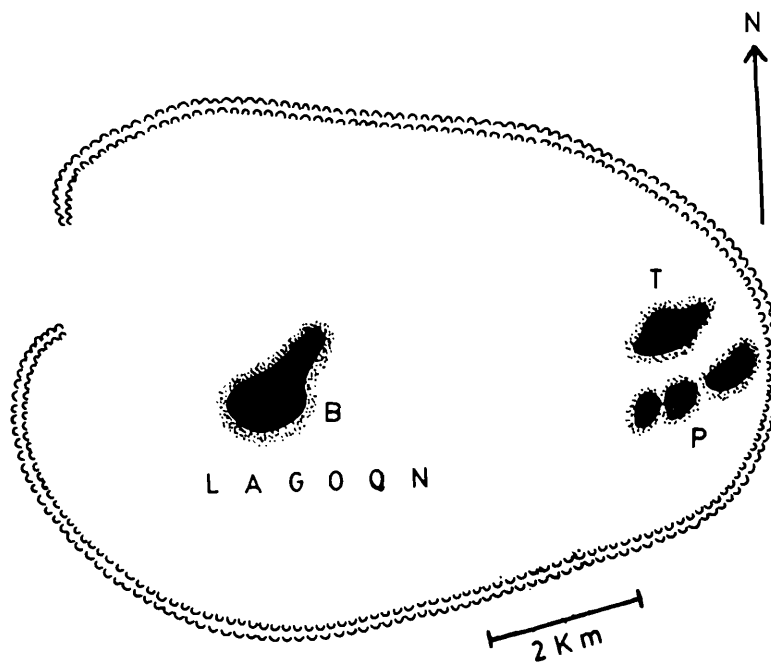


Fig. 16. Bangaram Island and its other Islets

rough during monsoon that during the period these islands remain practically cut off from each other and also from the rest of 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 a 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*, *Tolypocladiida*, *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 rattus rufescens* and *Rattus rattus 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 Polychaeta constituted the major groups comprising over 70% of the total numbers

(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, alghids, 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 clam *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-Maldiva 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.

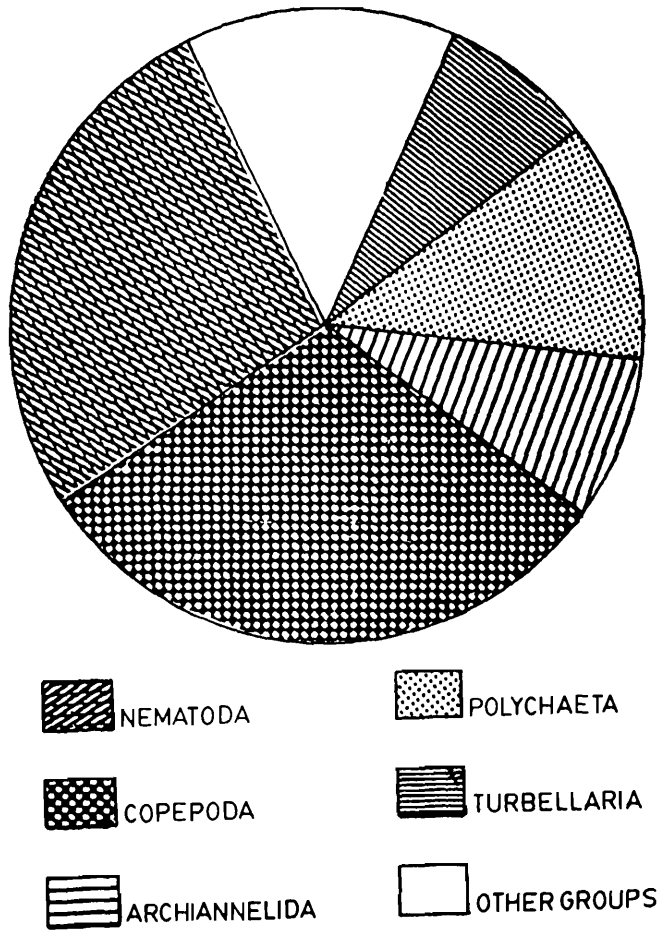


Fig. 17. Relative abundance of the diverse groups of meiofauna in littoral sediments on Lakshadweep

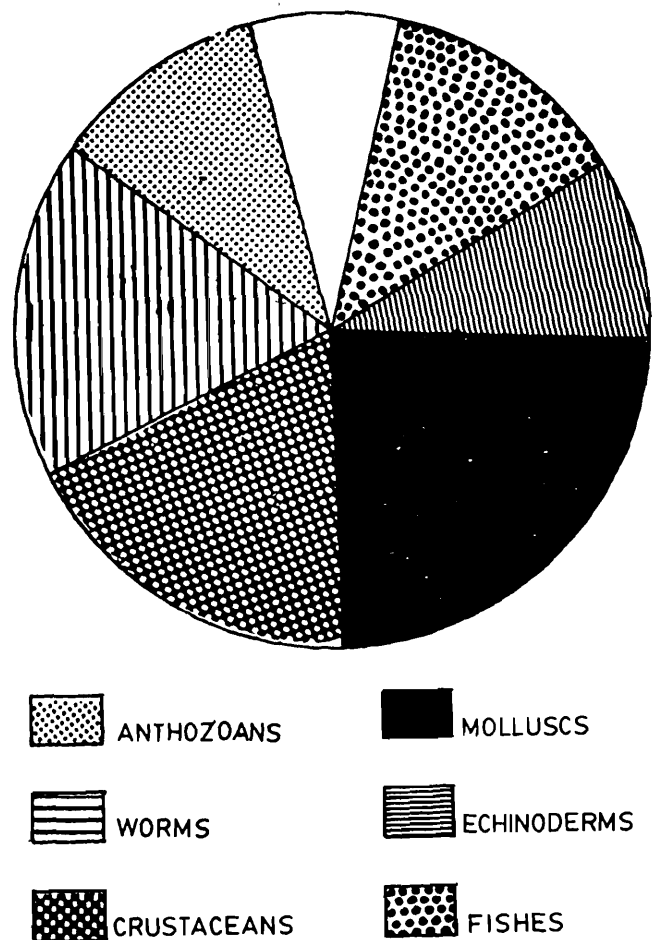


Fig. 18. Relative abundance of the diverse groups of macrofauna associated with the coral reefs on Lakshadweep.

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 variegated 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 meiobenthos 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, archannelids, 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, perches, 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. caeruleus*, *Chromis caeruleus*, *C. ternatensis*, *Gymnocaesio 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 turbulent 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, Maldiva 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 digitata* Linn., Money bread tree; *Aegle marmelos* Corr., Bael tree; *Aerva lanata* Juss., Medicinal herb; *Aeschynomene indica* Linn., Fodder plant; *Ageratum conyzoides* Linn., Goat weed; *Allium cepa* Linn., Onion; *Allizia lebbek* Benth., East Indian walnut; *Alstonia scholaris* R. Br., Dita Bark; *Alysicarpus monilifer* DC, Fodder 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; *Apluda mutica* Linn., Grass Plant; *Areca catechu* Linn. Arecanut tree; *Argemone mexicana* Linn., Prickly poppy; *Aristida plumosa* Linn., Fodder plant; *Artemisia absinthium* Linn. Wormwood plant; *Artemisia maritima* Linn. Wormseed plant; *Artocarpus altilis* (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; *Clausena indica* Oliver, Aromatic plant; *Clerodendrum inerme* (Linn.) Gaertn.; *Cocos nucifera* Linn., Coconut plant; *Codium variegatum* Blume, Croton plant; *Colocasia esculenta* (Linn.) Schjot., Cocoyam plant; *Corchorus aestuans* Linn., Medicinal plant; *Coriandrum sativum* Linn., Coriander plant; *Crataeva nurvala* Buch.-Ham., Medicinal shrub; *Crepis aculis* H.K., Herbaceous plant; *Crotalaria medicaginea* Lam., Fodder plant; *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 conglomeratus* Rottlb., Grass plant; *Cyperus cyperoides* (Linn.) Kunth, Grass plant; *Cyperus eleusinoides* Kunth., Fodder plant; *Cyperus kallingia* Endl., Medicinal plant; *Cyperus pennatus* Lam., Sand creeper; *Cyrtococcum 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 adscendens* (HB & K), Henr., Fodder plant; *Digitaria bicornis* (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* Link, 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 ferruginea* Vahl., Mat plant; *Fimbristylis spathacea* Roth., Weedy Plant; *Gloriosa superba* Linn., Malabar glory lily; *Glycomis pentaphylla* (Retz.) Correa., Medicinal plant; *Glyricidia maculata* Lam., Medicinal plant; *Gossypium arboreum* Linn., Cotton plant; *Grewia tenax* (Forsk.) Aschers. & Schwf., Fodder Plant; *Helianthus annuus* 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; *Ichnocarpus 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; *Ixora 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; *Modecca palmata* Lam., Medicinal herb; *Momordica charantia* Linn., Bitter gourd; *Morinda citrifolia* Linn., Dye plant; *Morinda coreia* Buch.-Ham., Medicinal plant; *Moringa oleifera* Lam., 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; *Nelsonia 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 andamanensium* Kurz., Pandanus plant; *Pandanus odoratissimus* Linn., Screw-pine; *Paspalum vaginatum* Sw., Sand-binder; *Passiflora goetida* Linn. Stinking passion flower; *Passiflora suberosa* Linn., Medicinal plant; *Pavetta indica* Linn., White pavetta plant; *Pemphis acidula* 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; *Pleurostylia 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 Communis* Linn., Castor Plant; *Rosa Alba* Linn., White cottage rose; *Rungia pectinata* (Linn.) Nees, Medicinal plant; *Ruta graveolens* Linn., Garden rue; *Saccharum 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; *Stachytarpheta utricaefolia* Sims, Medicinal herb; *Streblus asper* Lour., Siamese rough-bush; *Strobilanthes auriculatus* Nees, Medicinal herb; *Tamarindus indica* Linn., Tamarind tree; *Taraxacum officinale* Weber, Common dandelion; *Tecomella 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* (Boergts.); *Bryopsis corymbosa* J. Ag.; *Caulerpa clavifera* (Turn) Ag.; *Caulerpa cupressoides* (Vahl.) Ag.; *Caulerpa peltata* Lamour; *Caulerpa racemosa* (Forsk.) Weber; *Caulerpa scalpelliformis* (R.Br) Web.; *Caulerpa taxifolia* (Vahl.) Ag.; *Centroceras clavulatum* (Ag.) Mont.; *Ceramium moryae* Bosse; *Chaetomorpha littorea* Harv.; *Chaetomorpha torta* (Farlow) Mc Clath; *Champia parvula* (Ag.) Harvey; *Cheilosporum spectabile* Harvey; *Chondria armata* (Kuetz.) Okamura; *Chondrococcus hornemanii* (Mert.) Schmits; *Cladophora* sp.; *Cladophora fascicularis* (Martens) Kuetz.; *Cladophoropsis zellingeri* (Kuetz.) Boergs.; *Codium* sp.; *Codium coronatum* Setch.; *Codium tomentosum* Boergs.; *Colpomenia sinuosa* Derb. & Sol.; *Dictyopteris delicatula* Lamour; *Dictyosphaeria* sp.; *Dictyosphaeria cavernosa* (Forsk.) Boergs.; *Dictyosphaeria favulosa* (Ag.) Decaisne; *Dictyota bartayresiana* Lamour; *Dictyota dichotoma* (Huds.) Lamour; *Dictyurus purpurescens* Bory; *Ectocarpus arabicus* Fig. & De Nat.; *Ectocarpus simpliciusculus* Agardh; *Enantiocladia prolifera* (Grev.) 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.; *Goniolithon laccadivicum* Foslie; *Gracilaria arnata* J. Ag.; *Gracilaria corticata* J. Ag.; *Gracilaria crassa* Harv.; *Gracilaria edulis* (Gmel.) Silva; *Gracilaria folifera* (Forsk.) Boergs.; *Gymnogongrus pygmaeus* (Grev.) 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.; *Lithophyllum* sp.; *Lithothamnion fruticulosum* (Kuetz.) Foslie; *Neomeris annulata* Dickie; *Padina gymnospora* (Kuetz.) Vickers; *Padina pavonica* (Linn.) Thivy & Taylor; *Pocockiella variegata* (Lamour) Papenfuss; *Ralfsia ceylanica* Harv.; *Ralfsia verrucosa* (Arech.) C. Ag.; *Rhizoclonium grande* Boergs.; *Sarconema indicum* (J. Ag.) Kylon; *Sargassum aquifolium* (Turn) C. Ag.; *Sargassum duplicatum* Ag.; *Sargassum ilicifolium* (Turn.) J. Ag.; *Spyridia aculeata* J. Ag.; *Struvea anastamosans* Harv.) Piccone; *Tolypiocladia glamerulata* Agardh.; *Turbinaria conoides* Kuetz.; *Turbinaria decurrens* Bory.; *Turbinaria ornata* J. Ag.; *Turbinaria turbinata* (Linn.) Kuetz.; *Ulva fasciata* Deliele; *Ulva lactuca* Linn.; *Ulva rigida* C. Ag.; *Valonia aegagrophila* C. Ag.; *Valonia confervodies* Hasrv.; *Valoniopsis pachynema* (Martens) Boergs.; *Zonaria variegata* (Lamour) Ag.

## 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* (Klunzinger); *Abudefduf dickii* (Lienard); *Abudefduf glaucus* (Cuvier); *Abudefduf lacrymatus* (Quoy and Gaimard); *Abudefduf manikfani* Jones and kumaran; *Abudefduf saxatilis* (Linnaeus); *Abudefduf seotenfascuatus* (Cuvier); *Abudefduf sexfasciatus* (Lacepede); *Abudefduf sordidus* (Forsk.); *Abudefduf uniocellatus* (Quoy and Gaimard); *Abudefduf xanthozona* (Bleeker); *Abudefduf zonatus* (Cuvier); *Acanthocybium solandri* (Cuvier); *Acanthurus aliala* Lesson; *Acanthurus bleekeri* Gunther; *Acanthurus elongatus* (Lacepede); *Acanthurus leucosternon* Bennett; *Acanthurus lineatus* (Linnaeus); *Acanthurus mata* Valenciennes; *Acanthurus matoides* Valenciennes; *Acanthurus nigricans* (Linnaeus); *Acanthurus nigrofuscus* (Forsk.); *Acanthurus philippinus* Herre; *Acanthurus tennentii* Gunther; *Acanthurus triostegus triostegus* (Linnaeus); *Acentrogobius aestuarius* Smith; *Acentrogobius canninus* (C. & Valenciennes); *Acentrogobius cauerensis* (Bleeker); *Acentrogobius ornatus* (Ruppell); *Aesopia heterorhinos* (Bleeker); *Aetobatus narinari* (Euphrasen); *Albula vulpes* (Linnaeus); *Alectis ciliaris* (Bloch); *Alectis indicus* (Rupp.); *Alepisaurus ferx* Lowe.; *Allenetta barnesi* (Schultz); *Alopias vulpinus* (Bonnaterre); *Amanses sandwichiensis* (Quoy and Gainard); *Amanses scopas* (Cuvier & Valenciennes); *Ambassis commersoni* Cuvier & Valenciennes; *Ambassis urotaenia* Bleeker; *Amblygobius albimaculatus* (Ruppell); *Amphiprion alkallopos* Bleeker; *Amphiprion bicinctus* Ruppell; *Amphiprion chrysogaster* Cuvier; *Amphiprion ephipium* (Bloch); *Amphiprion nigripes* Regan; *Anampses ambionensis* Bleeker; *Anampses caeruleopunctatus* Ruppell; *Anampses diadematus* Ruppell; *Anarchias cantonensis* (Schultz); *Anarchias fuscus* Smith; *Anchoviella indica* (Vantasselt); *Anguilla bicolor* McClelland; *Antennarius chironectes* (Lacepede); *Antennarius coccineus* (Lesson); *Antennarius leprosus* (Eydoux and Souleget); *Antennarius nummifer* (Cuvier); *Antennarius tubersus* (Cuvier & Valenciennes); *Anthias cichlops* (Bleeker); *Anthias cooperi* Regan; *Anthias squamipinnis* (Peters); *Aphareus furcatus* (Lacepede); *Aphareus rutilans* Cuvier & Valenciennes; *Apogon coccineus* Ruppell; *Apogon fragilis* Smith; *Apogon leptacanthus* Bleeker; *Apogon nigripes* Plfr.; *Apogon sangiensis* Bleeker; *Apogonichthyoides nigripinnis* (Cuvier & Valenciennes); *Apogonichthyoides ocellatus* (Weber); *Apolectus niger* (Bloch); *Apolemichthys trimaculatus* (Lacepede); *Aporops allfreei* Smith; *Aprion virescens* Valenciennes; *Archamia fucata* (Cantor); *Archamia mozambiquensis* Smith; *Ariosoma anago* (Schlegel); *Ariosoma purpureus* (Alcock); *Aspidontus tractus* Fowler; *Asterropteryx semipunctatus* Ruppell; *Antherion africanus* Smith; *Aulostomatomorpha phosphorops* Alcock; *Aulostomus chinensis* (Linnaeus); *Auxis rochei* (Risso); *Auxis thazard* (Lacepede); *Balistapus undulatus* (Mungopark); *Balistoides conspicillum* (Bloch and Schneider); *Balistoides viridescens* (Bloch and Schneider); *Barrosia barrosi* Smith; *Bathygadus furvescens* Alcock; *Bathygadus multifilis* Gunther; *Bathygobius fuscus* (Ruppell); *Bathygobius petrophilus* (Bleeker); *Bathypterois atricolor* Alcock; *Bathypterois guentheri* Alcock; *Bathypterois insularum* Alcock; *Bathypterois squamosus* Alcock; *Belone platyura* Bennett; *Benthodesmus tenuis* Gunther; *Blennechis*

*filamentosus* Valenciennes; *Bolbometapon muricatus* (Cuvier & Valenciennes); *Bothus pantherinus* (Ruppell); *Brotula multibarbata* (Schl.); *Caesio chrysozona* Cuvier; *Caesio coeruleaureus* Lacepede; *Caesio lunaris* Cuvier & Valenciennes; *Caesio pisang* Bleeker; *Caesio tile* Cuvier; *Caesio xanthonotus* 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 harid* (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); *Caracanthus maculatus* (Gray); *Caracanthus unipinnus* (Gray); *Caranx armatus* (Forsk.); *Caranx chrysophrys* (Cuvier & Valenciennes); *Caranx compressus* Day; *Caranx crumenophthalmus* (Bloch); *Caranx ferdau* (Forsk.); *Caranx ignobilis* (Forsk.); *Caranx leptolepis* Cuvier; *Caranx lugubris* Poey; *Caranx malabaricus* (Bl. & Schn.); *Caranx melampygus* Cuvier; *Caranx oblongus* Cuvier & Valenciennes; *Caranx sansan* (Forsk.); *Caranx sexfasciatus* Quoy and Gaimard; *Caranx stellatus* Eydoux and Souleyet; *Carapus homei* (Richardson); *Carapus mourlani* (Petit); *Carapus parvipinnis* (Kaup); *Centropyge multispinis* (Playfair); *Cephalopholis argus* Bloch and Schneider; *Cephalopholis boenack* (Bloch); *Cephalopholis miniatus* (Forsk.); *Cephalopholis pachycentron* (Valenciennes); *Chaetodon bennetti* Cuvier; *Chaetodon citrinellus* Cuvier; *Chaetodon collare* Bloch; *Chaetodon falcula* Bloch; *Chaetodon kleini* Bloch; *Chaetodon lineolatus* Cuvier & Valenciennes; *Chaetodon lunula* (Lacepede); *Chaetodon melanotus* Bloch and Schneider; *Chaetodon meyeri* Bloch and Schneider; *Chaetodon trifasciatus* Mungopark; *Chaetodon unimaculatus* Bloch; *Chaetodon vagabundus* Linnaeus; *Chaetodon xanthocephalus* Bennett; *Chalixodytes tauensis* Schultz; *Champsodon capensis* Regan; *Chanos chanos* (Forsk.); *Chauliodus pammelas* Alcock; *Chauliodus sloani* Bloch & Schneider; *Cheilinus arenatus* Cuvier & Valenciennes; *Cheilinus chlorurus* (Bloch); *Cheilinus diagrammus* (Lacepede); *Cheilinus fasciatus* (Bloch); *Cheilinus exycephalus* Bleeker; *Cheilinus trilobatus* Lacepede; *Cheilinus undulatus* Ruppell; *Cheilio inermis* (Forsk.); *Cheilodipterus lachneri* Klausewitz; *Chelon seheli* (Forsk.); *Chirocentrus dorab* (Forsk.); *Chirocentrus brachysoma* (Bleeker); *Choeroichthys sculptus* (Gunther); *Choridactylus multibarbis* Rich.; *Chorinemus* sp.; *Chromis caeruleus* (Cuvier); *Chromis cinctus* (Plfr.); *Chromis chrysurus* (Bliss); *Chromis dimidiatus* (Klunzinger); *Chromis nigrurus* Smith; *Chromis opercularis* (Gunther); *Chromis simulans* Smith; *Chromis ternatensis* (Bleeker); *Cirrhhichthys aprinus* (Cuvier & Valenciennes); *Cirrhilabrus exquisitus* Smith; *Cirrhitis pinnulatus* (Bloch and Schneider); *Cirripectus quagga* (Fowler & Ball); *Cirripectus sebae* (Valenciennes); *Cirripectus stigmaticus* Strasburg & Schultz; *Cirripectus variolosus* (Valenciennes); *Coelorhynchus flabellispinis* (Alcock); *Coelorhynchus parallelus* (Gunther); *Coilia dussumieri* Cuvier & Valenciennes; *Conger cinereus* Ruppe; *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* (Forsk.); *Cryptotomus spinidens* (Quoy & Gaimard); *Ctenochaetus striatus* (Cuvier & Valenciennes); *Ctenochaetus strigosus* (Bennett); *Ctenogobiops crocineus* Smith; *Cyclothone microdon* (Gunther); *Cyclothone signata* Garman; *Cymolutes lecluse* (Quoy)

& Gaimard); *Cynoglossus brachycephalus* (Bleeker); *Cyprinus carpo* Linnaeus; *Cypselurus cyanopterus* (Valenciennes); *Cypselurus furcatus* (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* (Forsk.); *Dasyatis uarnak* (Forsk.); *Decapterus macrosoma* Bleeker; *Decapterus russelli* (Ruppell); *Dendrochirus brachypterus* (Cuvier); *Dendrochirus zebra* (Quoy & Gaimard); *Dendroscorpaena cirrhosa* (Thunb.); *Dermatorus trichiurus* Alcock; *Diagramma pictum* (Thunb.); *Diaphus fulgens* (Brauer); *Dicrolene intronigra* Goode & Bean; *Dinematichthys iluocoeteoides* Bleeker; *Diodon hystrix* Linnaeus; *Dipterygonotus leucogrammicus* Bleeker; *Doryrhamphus melanopleura* (Bleeker); *Dussumieria hasselti* Bleeker; *Duymaeria flagellifera* (Valenciennes); *Echeneis naucrates* Linnaeus; *Echidna delicatula* (Kaup); *Echidna leucotaenia* Schultz; *Echidna nebulosa* (Ahl.); *Echidna polyzona* (Richardson); *Echidna zebra* (Shaw); *Elagatis bipinnulatus* (Quoy and Gaimard); *Eleotriodes helsdingeni* Blkr.; *Eleotriodes sexguttatus* (Valenciennes); *Eleotriodes strigatus* (Broussonet); *Elops saurus* Linnaeus; *Enchelynassa canina* (Quoy & Gaimard); *Enchelywous kraussi* (Klunzinger); *Engyprosopon latifrons* (Regan); *Entomacrodus striatus* (Quoy & Gaimard); *Entomacrodus vermiculatus* (Valenciennes); *Epibulus insidiator* (Pallas); *Epinephelus caeruleopunctatus* (Bloch); *Epinephelus corallicola* (Valenciennes); *Epinephelus elongatus* Schultz.; *Epinephelus fario* (Thunberg); *Epinephelus fasciatus* (Forsk.); *Epinephelus flavocaeruleus* (Lacepede); *Epinephelus fuscoguttatus* (Forsk.); *Epinephelus hexagonatus* (Bloch and Schneider); *Epinephelus melanostigma* Schultz; *Epinephelus merra* Bloch; *Epinephelus morrhua* (Valenciennes); *Epinephelus tauvina* (Forsk.); *Epinephelus summana* (Forsk.); *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 neophytus* (Gunther); *Galeocерdo cuvieri* (Le Seuer); *Gartrophysus sceleratus* (Forster); *Gaterin albovittatus* (Ruppell); *Gaterin gaterinus* (Forsk.); *Gaterin nigrus* (Cuvier); *Gaterin orientalis* (Bloch); *Gaterin shotaf* (Forsk.); *Gazza minuta* (Bloch); *Gempylus serpens* Cuvier; *Gerres filamentosus* Cuvier; *Gerres lucidus* Cuvier; *Gerres oblongus* Cuvier; *Gerres oyena* (Forsk.); *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); *Gymnothorax buroensis* (Bleeker); *Gymnothorax fimbriatus* (Bennett); *Gymnothorax flavimarginatus* (Ruppell); *Gymnothorax javanicus* (Bleeker); *Gymnothorax monochrous* Bleeker; *Gymnothorax monostigmus* (Regan); *Gymnothorax permistus* (Smith); *Gymnothorax petelli* (Bleeker); *Gymnothorax pictus* (Ahl.); *Gymnothorax pseudothyrsoides* (Bleeker); *Gymnothorax reticulatus* Bloch; *Gymnothorax richardsoni* (Bleeker); *Gymnothorax ruppelli* (McClelland); *Gymnothorax undulatus* (Lacepede); *Halichoeres argus* (Bloch and Schneider); *Halichoeres bimaculatus* Ruppell; *Halichoeres centriquadus* (Lacepede); *Halichoeres kawrin* (Bleeker); *Halichoeres marginatus* Ruppell; *Halichoeres notopsis* (Valenciennes); *Halichoeres scapularis* (Bennett); *Halosauropsis affinis* (Gunther); *Halosauropsis mediorostris* (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); *Histrio histrio* Linnaeus); *Holocentrus andamanensis* Day; *Holocentrus caudimaculatus* Ruppell; *Holocentrus cornutus* Blkr.; *Holocentrus diadema* Lacepede; *Holocentrus laeteoguttatus* Cuvier; *Holocentrus laevis* Gunthur; *Holocentrus opercularis* Cuvier and Valenciennes; *Holocentrus rubber* (Forsk.); *Holocentrus sammara* (Forsk.); *Holocentrus spinifer* (Forsk.); *Holocentrus violaceus* Bleeker; *Hologymnosus semidiscus* (Lacepede); *Hyporhamphus balinensis* (Bleeker); *Hyporhamphus dussumieri* (Valenciennes); *Hyporhamphus georgi* (Valenciennes); *Hyporhamphus unifasciatus* (Ranzani); *Ichthyocampus belcheri* Kaup; *Ilisha melastoma* (Cuvier); *Iniistius pavo* (Valenciennes); *Inimicus filamentosus* (Cuvier & Valenciennes); *Istiblennius edentulus* (Bloch and Schneider); *Istiblennius lineatus* (Valenciennes); *Istiblennius periophthalmus* (Valenciennes); *Istiompax indicus* (Cuvier & Valenciennes); *Istiophorus platypterus* (Shaw & Nodder); *Isurus glauces* (Muller & Henle); *Johnius diacanthus* (Lacepede); *Johnius maculatus* Bloch and Schneider; *Jordanicus gracilis* (Bleeker); *Katsuwonus pelamis* (Linnaeus); *Kraemeria samoensis* Steindachner; *Kuhlia taeniura* (Cuvier); *Kyphosus cinerascens* (Forsk.); *Kyphosus 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 semicinctus* (Lay and Bennett); *Lepidochromis brunneus* Smith; *Lepidoplois axillaris* (Benn.); *Lepidoplois hirsutus* (Lacepede); *Lepidozygus tapeinosoma* (Bleeker); *Leptoscarus vaigiensis* (Quoy and Gaimard); *Lestidium indopacificum* Ege.; *Lethrinella microdon* (Valenciennes); *Lethrinella miniatus* (Forster-Schneider); *Lethrinella variegatus* (Cuvier & Valenciennes); *Lethrinella xanthocheilus* (Klunzinger); *Lethrinus borbonicus* (Cuvier & Valenciennes); *Lethrinus haraj* (Forsk.); *Lethrinus lent jan* (Lacepede); *Lethrinus mahsena* (Forsk.); *Lethrinus obsoletus* (Forsk.); *Liachirus melanospilus* (Bleeker); *Lionurus pumiliceps* (Alcock); *Liza* sp.; *Lobotes surinamensis* (Bloch); *Lophiododon calori* (Bianconi); *Lutianus bohar* (Forsk.); *Lutianus fulviflamma* (Forsk.); *Lutianus gibbus* (Forsk.); *Lutianus johni* (Bloch); *Lutianus kasmira* (Forsk.); *Lutianus lineolatus* (Rupp.); *Lutiannus russelli* (Bleeker); *Lutiannus sanguineus* (Cuvier & Valenciennes); *Lutiannus vaigiensis* (Quoy and Gaimard); *Lutiannus meleagris* Plfr.; *Macolor niger* (Forsk.); *Macropharyngodon meleagris* (Valenciennes); *Macrourus hextii* Alcock; *Macrourus nasutus* (Gunther); *Macrourus woodmasoni* Alcock; *Makaira indica* (Cuvier); *Makaira nigricans* Lacepede; *Malacanthus latovittatus* (Lacepede); *Manta birostris* (Walbaum); *Megalaspis cordyla* (Linnaeus); *Megalops cyprinoides* (Brouss); *Megaprotodon strigangulus* (Gmelin); *Melichthys niger* (Bloch); *Mene maculata* (Bloch and Schneider); *Minous inermis* Alcock; *Minous monodactylus* (Bl. & Schn.); *Mobula diabolus* (Shaw); *Monodactylus argenteus* (Linnaeus); *Monomitopus nigripinnis* Alcock; *Monotaxis grandoculis* (Forsk.); *Moringua abbreviata* (Bleeker); *Moringua bicolor* Kaup; *Moringua javanica* (Kaup); *Moringua macrochir* Bleeker; *Moringua microchir* Bleeker; *Mucogobius liolepis* (Koumans); *Mulloidichthys auriflamma* (Forsk.); *Mulloidichthys samoensis* (Gunther); *Muraenichthys macropterus* Bleeker; *Myctophum affine* (Lutken); *Myctophum andreae* (Lutken); *Myctophum aurolaternatum* Garman; *Myctophum evermanni* Gilbert; *Myctophum reinhardtii* (Lutken); *Myctophum spinosum* (Steindachner); *Myrichthys colubrinus* (Boddaert); *Myrichthys maculosus* (Cuvier);

*Myripristis adustus* Bleeker; *Myripristis murdjan* (Forsk.); *Narcetes erimelas* Alcock; *Naso annulatus* (Quoy & Gaimard); *Naso brachycentron* (Valenciennes); *Naso brevirostris* (Valenciennes); *Naso lituratus* (Bloch and Schneider); *Naso tuberosus* Lacepede; *Naso unicornis* (Forsk.); *Naso vlamingi* (Valenciennes); *Naucrates ductor* (Linnaeus); *Nebrius concolor* Ruppell; *Nemipterus nemurus* (Bleeker); *Neopythites pterotus* Alcock; *Novaculichthys macrolepidotus* (Bloch); *Novaculichthys taeniourus* (Lacepede); *Odonus niger* (Ruppell); *Omobranchus elongatus* (Peters); *Omobranchus mekranensis* (Regan); *Ophichthus marginatus* (Peters); *Ophichthus altipinnis* (Kaup); *Osbeckia scripta* (Osbeck); *Ostorhynchus apogonides* (Bleeker); *Ostorhynchus endekataenia* (Bleeker); *Ostorhynchus moluccensis* (Valenciennes); *Ostorhynchus novemfasciatus* (Cuvier); *Ostorhynchus nubilus* (Garman); *Ostorhynchus quadrifasciatus* (Cuvier); *Ostorhynchus savayensis* (Gunther); *Ostracion meleagris* Shaw; *Ostracion sebae* (Bleeker); *Ostracion tuberculatus* Linnaeus; *Oxymonacanthus longirostris* (Bloch and Schneider); *Oxyporhamphus micropterus micropterus* (Valenciennes); *Oxyurichthys microlepis* (Bleeker); *Pampus argenteus* (Euphrasen); *Panchax panchax* (Hamilton Buchanan); *Paracaesio xanthurus* Bleeker; *Paracanthurus hepatus* (Linnaeus); *Paracirrhites forsteri* (Bloch and Schneider); *Paragobiodon echinocephalus* (Ruppell); *Paraluteres prinurus* (Bleeker); *Paramia quinquelineata* (Cuvier); *Paramonacanthus choirocephalus* (Bleeker); *Paramonacanthus oblongus* (Temminck and Schlegel); *Parapercis hexophthalma* (Cuvier); *Parapercis nebulosa* (Quoy & Gaimard); *Parapercis quadrispinosa* (Weber); *Paraplagusia bilineata* (Bloch); *Parapriacanthus guntheri* (Klunzinger); *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 pleurostigma* (Bennett); *Parupeneus trifasciatus* (Lacepede); *Pegasus draconis* Linnaeus; *Pempheris oualensis* Cuvier; *Petroscirtetes mitratus* (Ruppell); *Petroscirtetes pindae* Smith; *Phtheirichthys lineatus* (Menzies); *Pisoodonophis cancrivorus* (Richardson); *Platax orbicularis* (Forsk.); *Platax pinnatus* (Linnaeus); *Platax teira* (Forsk.); *Platycephalus crocodilus* Tilesius; *Platycephalus indicus* (Linnaeus); *Platycephalus malayanus* Bleeker; *Platyroctes apus* Gunther; *Plectropomus maculatus* (Bloch); *Plesiops caeruleolineatus* Ruppell; *Plicomugil labiosus* (Valenciennes); *Plotosus anguillaris* (Lacepede); *Polymixia japonica* Gunther; *Polynemus heptadactylus* Cuvier; *Polynemus plebeius* Broussonet; *Polynemus sexfilis* Valenciennes; *Pomacanthodes imperator* (Bloch); *Pomacanthodes semicirculatus* (Cuvier); *Pomacentrus albicaudatus* Baschieri-Salvadori; *Pomacentrus albifasciatus* Schlegel and Muller; *Pomacentrus littoralis* Cuvier; *Pomacentrus lividus* (Bloch and Schneider); *Pomacentrus melanopterus* Bleeker; *Pomacentrus nigricans* (Lacepede); *Pomacentrus paxo* (Bloch); *Pomacentrus sulfureus* Klunzinger; *Pomacentrus tripunctatus* (Cuvier & Valenciennes); *Pomadasyd maculatus* (Bloch); *Pranesus pinguis* (Lacepede); *Priacanthus boops* (Bloch & Schneider); *Priacanthus cruentatus* (Lacepede); *Priacanthus hamrur* (Forsk.); *Prionobutis koilomatodon* (Bleeker); *Pristiapogon fraenatus* (Valenciennes); *Pristiapogon synderi* (Jordan & Evermann); *Prognichthys gibbifrons* (Valenciennes); *Promethichthys prometheus* (Cuvier); *Psenes cyanophrus* Cuvier; *Psettodes erumei* (Schneider); *Pseudamia gelatinosa* Smith; *Pseudobalistes flavimartinatus* (Ruppell); *Pseudocheilinus hexataenia* (Bleeker); *Pseudochromis dutoiti* Smith; *Pseudochromis tapeinosoma* Bleeker; *Pseudogramma polyacanthus* (Bleeker); *Pseudopeneus indicus* (Shaw); *Pseudorhombus arsius* (Hancock); *Psilocephalus 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 inhacae* (Smith); *Rachycentron canadus* (Linnaeus); *Rastrelliger kanagurta* Ruppell; *Remora albescens* (Temminck and Schlegel); *Remora osteochir* (Cuvier); *Remora remora* (Linnaeus); *Rhabdamia cypselurus* Weber; *Rhabdamia gracilis* (Bleeker); *Rhabdosargus sarba* (Forsk.) ; *Rhina ancylostoma* Bloch and Schneider; *Rhinecanthus aculeatus* (Linnaeus); *Rhinecanthus rectangulus* (Schneider); *Rhineodon typus* Smith; *Rhinoptera javanica* Muller and Henle; *Rhynchobatus djiddensis* (Forsk.) ; *Rhynchostracion nasus* (Bloch); *Runula rhinorhynchus* (Bleeker); *Runula tapeinosoma* (Bleeker); *Ruvettus pretiosus* Cocco; *Salarias dussumieri* Cuvier and Valenciennes; *Salarias fasciatus* (Bloch); *Sarda orientalis* (Temminck & Schlegel); *Sarda sarda* (Cuvier and Valenciennes); *Sardinella clupeioides* (Bleeker); *Sardinella fimbriata* (Valenciennes); *Sardinella melanura* (Cuvier); *Sarotherodon mossambicus* (Peters); *Saurida gracilis* (Quoy and Gaimard); *Saurida undosquamis* Richardson; *Scarus dubius* (Bennett); *Schindleria pietschmanni* (Schindler); *Schindleria praematura* (Schindler); *Scoliodon walbeehmi* (Bleeker); *Scolopsis bilineatus* (Bloch); *Scolopsis frenatus* (Cuvier and Valenciennes); *Scomberoides sanctipteri* (Cuvier); *Scomberoides tol* (Cuvier); *Scomberomorus commersoni* (Lacepede); *Scomberomorus guttatus* (Bloch & Schneider); *Scopelogadus mitsukurini* (Garrett); *Scorpaenodes guamensis* (Quoy and Gaimard); *Scorpaenodes parvipinnis* (Garrett); *Scorpaenopsis cirrhosa* (Thunberg); *Scorpaenopsis gibbos* (Bloch and Schneider); *Sebastapistes nuchalis* (Gunther); *Sebastapistes oclinus* (Smith); *Sebastapistes strongia* (Cuvier); *Secutor insidiator* (Bloch); *Serriolina nigrofasciata* (Ruppell); *Serrivomer microps* (Alcock); *Siderea picta* (Ahl); *Siganus canaliculatus* (Bl. & Schneider); *Siganus corallinus* (Cuvier & Valenciennes); *Siganus javus* (Linnaeus); *Siganus oramin* Bloch & Schneider; *Siganus rostratus* (Valenciennes); *Siganus stellatus* (Forsk.) ; *Sillago sihama* (Forsk.) ; *Solenostomus cyanopterus* Bleeker; *Sphaeroides hypselogeneion* (Bleeker); *Sphyrna barracuda* (Walbaum); *Sphyrna chinensis* Lacepede; *Sphyrna chrysotaenia* Klunzinger; *Sphyrna forsteri* Cuvier; *Sphyrna jello* Cuvier & Valenciennes; *Sphyrna novaehollandiae* Gunther; *Sphyrna zygaena* (Linnaeus); *Spratelloides delicatulus* (Bennett); *Spratelloides japonicus* (Houttuyn); *Stegostoma varium* (Seba); *Stenatherina temmincki* (Bleeker); *Stethojulis albobittata* (Bonnaterre); *Stethojulis axillaris* (Quoy and Gaimard); *Stethojulis phkadopleura* (Bleeker); *Stethojulis strigiventer* (Bennett); *Stethojulis trilineata* (Bloch and Schneider); *Stomias affinis* Gunther; *Strongylura gigantea* (Temminck and Schlegel); *Strongylura incisa* (Valenciennes); *Strongylura melanota* (Bleeker); *Strongylura strongylura* (Van Hasselt); *Sufflamen chrysoptera* (Bloch and Schneider); *Synanceia horrida* (Linnaeus); *Synanceia verrucosa* Bloch and Schneider; *Synaphobranchus pinnatus* (Gronov); *Syngnathoides biaculeatus* (Bloch); *Syngnathus cyanospilus* Bleeker; *Syngnathus spicifer* 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* (Forsk.) ; *Thalassoma quinquevittata* (Lay and Bennett); *Thalassoma umbrostigma* (Ruppell); *Thalassosteus appendiculatus* (Klunzinger); *Therapon jarbua* (Forsk.) ; *Therapon puta* Cuvier; *Therapon theraps* Cuvier; *Thunnus albacares* (Bonnaterre); *Thunnus obesus* (Lowe); *Thunnus sibi* (Temminck & Schlegel); *Thyrsitoides marleyi* 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); *Tripterygion fasciatum* Weber; *Tripterygion gymnauchen* Weber; *Tripterygion 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 vittatus* (Forsk.) Uroconger *braueri* Weber and de Beaufort; *Urogymnus africanus* (Bloch and Schneider); *Uropterygius marmoratus* (Lacepede); *Uropterygius tigrinus* (Lesson); *Variola louti* (Forsk.); *Vinciguerria lucetia* (Garman); *Xanothon bipallidus* Smith; *Xanothon margaritus* (Carter); *Xanothon venosus* (Cuvier & Valenciennes); *Xenomystax trucidans* Alcock; *Xiphias setifer* Swainson; *Xiphias gladius* Linnaeus; *Zanclus canescens* (Linnaeus); *Zanclus cornutus* (Linnaeus); *Zebrasoma 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 liocephalus* (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; *Eretmochelys imbricata* (Linnaeus), Hawksbill turtle; *Gekko smithi* Gray, Smith's gecko; *Hemidactylus frenatus* Schlegel, House gecko; *Hydrophis nigrocinctus* 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; *Lepidochelys 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 interpres interpres* (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* (Lesson), Antarctic skua; *Charadrius alexandrinus alexandrinus* Linnaeus, Kentish plover; *Charadrius hiaticula tundrae* (Lowe), Eastern ringed plover; *Charadrius leschenaultii* Lesson, 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 scolapacea scolapacea* (Linnaeus), The koel; *Falco tinnunculus tinnunculus* Linnaeus, European kestrel; *Gallinago megala* Swinhoe, Swinhoe's snipe; *Haliaeetus leucogaster* (Gmelin), White-bellied sea-eagle; *Hirundo rustica gutturalis* 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 ruft; *Pluvialis apricaria apricaria* (Linnaeus), Golden plover; *Pluvialis dominica fulva* (Gmelin), Eastern golden plover; *Pluvialis squatarola* (Linnaeus), Grey plover; *Procellaria pacifica chlororhyncha* (Lesson), Wedge-tailed shear water; *Puffinus persicus* Hume, The Persian shearwater; *Sterna albifrons albifrons* 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 mathewsi* Stresemann, Western black-naped tern; *Streptopelia orientalis orientalis* (Latham), Turtle dove; *Strix leptogrammica indraee* 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

*Balenoptera 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.

## 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 jelly and ringed with nail-polish.

## LIST OF MEIOFAUNA SPECIES

### HYDROZOA

1. *Halammohydra octopodides* Remane, 1927.

### TURBELLARIA

2. *Acanthomacrostromum gerlachi* Ax, 1971; 3. *Otoplana subterranea* Ax, 1951; 4. *Gyratrix hermaphroditus* Ehrenberg, 1831.

### NEMATODA

5. *Anticoma arctica* Steiner, 1916; 6. *Anticoma acuminata* (Eberth, 1863); 7. *Anticoma lata* Cobb, 1898; 8. *Platycoma africanum* (Gerlach, 1959); 9. *Oxystomina alpatovi*

(Filipjev, 1927); 10. *Porocoma striata* Cobb, 1920; 11. *Halalaimus filum* Gerlach, 1962; 12. *Halalaimus supercirrhatus* Gerlach, 1955; 13. *Halalaimus* sp.; 14. *Odontophora furcata* Wieser, 1956; 15. *Cynura papillata* Gerlach, 1962; 16. *Oncholaimus brachycercus* De Man, 1889; 17. *Sabatieria hilarula* De Man, 1922; 18. *Sabatieria abyssalis* (Filipjev, 1918); 19. *Chromadora vulgaris* Bastian, 1865; 20. *Spilophorella paradoxa* (De Man, 1888); 21. *Halichoanolaimus robustus* (Bastian, 1865); 22. *Latronema orcinum* (Gerlach, 1952); 23. *Synonchium obtusum* Cobb, 1920; 24. *Paracyatholaimus duplicatus* Gerlach, 1964; 25. *Metachromadora clavata* Gerlach, 1957; 26. *Chromaspirina madagascariensis* Gerlach, 1953; 27. *Spirinia laevioides* Gerlach, 1963; 28. *Desmodora megalosoma* Steiner, 1918; 29. *Desmodora brevicollis* (Cobb, 1920); 30. *Desmodora cinctum* (Cobb, 1920); 31. *Desmodora conocephala* Steiner, 1918; 32. *Monoposthia costata* (Bastian, 1965); 33. *Rhinema retrosum* Cobb, 1920; 34. *Metepsilonema* sp.; 35. *Eubostrichus exilis* (Cobb, 1920); 36. *Monhystera parva* (Bastian, 1865); 37. *Theristus setifer* Gerlach, 1952; 38. *Rhynchonema cinctum* Cobb, 1920; 39. *Procamalaimus tubifer* Gerlach, 1953; 40. *Camacolaimus prytherchi* Chitwood, 1935; 41. *Bathylaimus depressus* Gerlach, 1962; 42. *Cytolaimium exile* Cobb, 1920.

#### GASTROTRICHA

43. *Macrodasytis indica* n.sp.; 44. *Urodasytis viviparus* Wilke, 1954; 45. *Acanthodasytis aculeatus* Remane, 1927; 46. *Thaumastoderma heideri* Remane, 1926; 47. *Tetranchyroderma indica* Rao and Ganapati, 1968; 48. *Tetranchyroderma paralittoralis* n. sp.; 49. *Pseudostomella indica* Rao, 1970; 50. *Dactylopodola indica* (Rao and Ganapati, 1968); 51. *Turbanella aminensis* n. sp.; 52. *Paraturbanella brevicaudatus* n. sp.; 53. *Xenotrichula velox* Remane, 1927; 54. *Xenotrichula laccadivensis* n. sp.; 55. *Chaetonotus atrox* Wilke, 1954; 56. *Chaetonotus triradiatus* n. sp.; 57. *Chaetonotus* sp.; 58. *Aspidophorus marinus* Remane, 1926.

#### KINORHYNCHA

59. *Echinoderes ehlersi* Zelinka, 1913; 60. *Echinoderes* sp.; 61. *Cateria gerlachi* Higgins, 1968.

#### ARCHIANNELIDA

62. *Polygordius madrasensis* Aiyar and Alikunhi, 1944; 63. *Polygordius uroviridis* Aiyar and Alikunhi, 1944; 64. *Protodrilus indicus* Aiyar and Alikunhi, 1944; 65. *Protodrilus pierantonii* Aiyar and Alikunhi, 1944; 66. *Protodrilus* sp.; 67. *Saccocirrus minor* Aiyar and Alikunhi, 1944; 68. *Saccocirrus orientalis* Alikunhi, 1946; 69. *Saccocirrus krusadensis* Alikunhi, 1948; 70. *Dinophilus gyrotilatus* (Schmidt, 1848); 71. *Diurodrilus benazzii* Gerlach, 1952; 72. *Nerilla antennata* Schmidt, 1863; 73. *Nerillidium* sp.

#### POLYCHAETA

74. *Pisione gopalai* (Alikunhi, 1941); 75. *Pisione complexa* Alikunhi, 1947; 76. *Pisione africana* Day, 1963; 77. *Pisionidens indica* (Aiyar and Alikunhi, 1940); 78. *Microphthalmus urofimbriatus* Alikunhi, 1948; 79. *Hesionides arenaria* Friedrich, 1937; 80. *Hesionides gohari* Hartmann-Schroder, 1960; 81. *Hesionides minima* Westheide and

Rao, 1977; 82. *Hesionides* sp.; 83. *Hesionura elongata* (Southern, 1914); 84. *Eusyllis homocirrata* Hartmann-Schroder, 1958; 85. *Typosyllis variegata* (Grube, 1960); 86. *Typosyllis* sp.; 87. *Sphaerosyllis minima* Hartmann-Schroder, 1960; 88. *Sphaerosyllis bengalensis* Rao and Ganapati, 1966; 89. *Brania subterranea* (Hartmann-Schroder, 1966); 90. *Petitia amphophthalma* Siewing, 1955; 91. *Ehlersia cornuta* (Rathke, 1923); 92. *Goniadides aciculata* Hartmann-Schroder, 1960.

## COPEPODA

93. *Longipedia weberi* Scott, 1909; 94. *Longipedia kikuchii* Ito, 1980; 95. *Scottolana longipes* (Thompson and Scott, 1903); 96. *Ectinosoma melaniceps* Boeck, 1864; 97. *Halectinosoma langi* Wells, 1965; 98. *Arenosetella germanica* Kunz, 1937; 99. *Lineosoma intermedia* (Wells, 1965); 100. *Hastigerella leptoderma* (Kile, 1929); 101. *Harpacticus gracilis* Claus, 1863; 102. *Tisbisoma triarticulatum* Wells, 1967; 103. *Porcellidium ravanae* Thompson and Scott, 1903; 104. *Peltidium ovale* Thomson and Scott, 1903; 105. *Peltidium angulatum* Thomson and Scott, 1903; 106. *Phyllothalestris mysis* (Claus, 1863); 107. *Rhynchothalestris rufocincta* (Brady, 1880); 108. *Diarthrodes cystoecus* Fahrenbach, 1954; 109. *Eudactylopus andrewi* Sewell, 1940; 110. *Idomene maldivae* (Sewell, 1940); 111. *Parastenhelia hornelli* Thomson and Scott, 1903; 112. *Diosaccus monardi* Sewell, 1940; 113. *Stenhelia polluta* Monard, 1928; 114. *Stenhelia madrasensis* Wells, 1971; 115. *Robertsonia propinqua* (Scott, 1894); 116. *Robertsonia adduensis* (Sewell, 1940); 117. *Amphiascoides subdebilis* (Willey, 1935); 118. *Amphiascopsis cinctus* (Claus, 1866); 119. *Metamphiascopsis nicobaricus* (Sewell, 1940); 120. *Haloschizopera tenuipes* Noodt, 1964; 121. *Metis jusseaumei* (Richard, 1893); 122. *Ameira parvula* (Claus, 1866); 123. *Sicameira langi* Rao, 1972; 124. *Nitocra affinis rijekana* Petkovski, 1954; 125. *Paraleptomesochra minima* Wells, 1967; 126. *Parapseudoloftomesochra trisetosa* (Krishnaswamy, 1957); 127. *Kliopsyllus wilsoni* (Krishnaswamy, 1957); 128. *Kliopsyllus psammophilus* (Noodt, 1964); 129. *Kliopsyllus* sp.; 130. *Apodopsyllus camptus* Wells, 1971; 131. *Paramesochra longicaudata* Nicholls, 1945; 132. *Phyllopodopsyllus aegypticus* Nicholls, 1944; 133. *Mesochra pygmaea* (Claus, 1863); 134. *Leptastacus waltirensis* Rao and Ganapati, 1969; 135. *Psammastacus spinicaudatus* Rao and Ganapati, 1969; 136. *Arenopontia subterranea* Kunz, 1937; 137. *Arenopontia indica* Rao, 1967; 138. *Psammopsyllus operculatus* Nicholls, 1945; 139. *Sewellina reductus* Krishnaswamy, 1957; 140. *Enhydrosoma littorale* Wells, 1967; 141. *Laophonte cornuta* Philippi, 1940; 142. *Quinquelaophonte quinquespinosa* (Sewell, 1924); 143. *Echinolaophonte tropica* Ummerkutty, 1970.

## ISOPODA

144. *Angeliara phreaticola* Chappuis and Delamare, 1954; 145. *Microcerberus predatoris* (Gnanamuthu, 1954); 146. *Microcerberus anfindicus* Messana, Argano and Baldari, 1978.

## TARDIGRADA

147. *Batillipes mirus* Richters, 1909; 148. *Parastygarctus higginsii* Renaud-Debyser, 1965.

## HALACARIDA

149. *Halacarus anomalus* Trouessart, 1894.

## MOLLUSCA

150. *Caecum glabrum* (Montagu, 1803); 151. *Pseudovermis indicus* Salvini-Plawen and Rao, 1973; 152. *Microhedyle* sp.

## SYSTEMATIC ACCOUNT

Phylum CNIDARIA  
 Class HYDROZOA  
 Order ACTINULIDA  
 Family HALAMMOHYDRIDAE

Genus *Halammohydra* Remane, 1927

1. *Halammohydra octopodides* Remane

1927. *Halammohydra octopodides* Remane, *Zeitschr. Morphol. Oekol.*, 7 : 643.

*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

1971. *Acanthomacrostomum gerlachi* Ax, *Microfauna Meeresboden*, 8 : 1.

*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.

1951. *Otoplana subterranea* Ax, *Zool. Jahrb.*, 80 : 227.

**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, Medeterranean, Arabian Sea and Bay of Bengal.

Order    NEORHABDOCOELA  
Family    POLYCYSTIDAE  
Genus     Gyratrix Ehrenberg, 1831

### 4. *Gyratrix hermaphroditus* Ehrenberg

1831. *Gyratrix hermaphroditus* Ehrenberg, *Z. Morphol. Okol.*, 3 : 255.

*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 Mcixner (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

1916. *Anticoma arctica* Steiner, *Zool. Jahrb. Abt. Syst.*, 39 : 511.

*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* : Artic Sea, North Sea, Atlantic, Pacific, Red Sea, Bay of Bengal.

#### 6. *Anticoma acuminata* (Eberth)

1962. *Anticoma acuminata* (Eberth) Gerlach, *Kieler Meeresforsch.*, 18 : 84.

*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  $\mu\text{m}$  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

1898. *Anticoma lata* cobb, *Proc. Linn. Soc. N.S. Wales*, 23 : 385.

*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  $\mu\text{m}$  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)

1959. *Platycomopsis africanus*, Gerlach, *Zool. Anz.*, 163 : 361.

*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)

1927. *Oxystomina alpatovi* Filipjev, *Arch. Naturgesch.*, 91 : 87.

**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  $\mu$ m 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

1920. *Porocoma striata* Cobb, *Contrib. Sci. Nemat.*, 9 : 226.

**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

1962. *Halalaimus filum* Gerlach, *Kieler Meeresforsch.*, 18 : 90.

**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  $\mu\text{m}$  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

1955. *Halalaimus supercirrhatus* Gerlach, *Ztschr. wiss. Zool.*, 158 : 264.

**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  $\mu\text{m}$  long and situated about 4.8 head diameters from anterior end. Tail

conical anteriorly and filiform posteriorly. Anal glands indistinct. Spinnert present. Male unknown.

*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.

Family AXONOLAIMIDAE

Genus *Odontophora* Buetschli, 1874

#### 14. *Odontophora furcata* Wieser

1956. *Odontophora furcata* Wieser, *Lunds Univ. Arsstor. N.F.*, 52 : 83.

*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.

Family LEPTOLAIMIDAE

Genus *Cynura* Cobb, 1920

#### 15. *Cynura papillata* Gerlach

1962. *Cynura papillata* Gerlach, *Kieler Meeresforsch.*, 18 : 101.

*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  $\mu\text{m}$  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  $\mu\text{m}$  deep. Oesophagus highly muscular, with a distinct posterior bulb. Tail short and conical. Spicule in male 60  $\mu\text{m}$  or about 1.0 anal diameter long. Two preanal supplements on the ventromedian surface are 30 and 40  $\mu\text{m}$  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

1889. *Oncholaimus brachycercus* De Man, *Mem. Soc. Zool. France*, 2 : 1.

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

**Diagnostic features** : Cuticle smooth and transparent. Head diameter 52  $\mu\text{m}$ . Lips, labial palillae 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 spinnert. Cement glands well developed with long ducts. Spicule in male 120  $\mu\text{m}$  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

1922. *Sabatieria hilarula* De Man, *Tijdschr. Nederl. Dierk. Vereen.*, 18 : 127.

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

**Diagnostic features** : Cuticular punctation 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  $\mu\text{m}$  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)

1918. *Parasabatiera abyssalis* Filipjev, *Savastopol Biol. Stan. Ross Akad. Nauk*, 2 : 350.

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

**Diagnostic features** : Cuticle punctate with vertical and horizontal differentiation. Lateral fields with large irregular dots. Labial setae short. Four cephalic setae present attaining 1/2 the head diameter in length. Cervical setae very short. Amphid spiral type. Tail conical-cylindrical with 3-celled caudal gland. Spicule in male 62  $\mu\text{m}$  long or 2.0 anal diameters long. Gubernaculum with posterior apophysis. Fine preanal supplements present.

**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

1865. *Chromadora vulgaris* Bastian, *Trans. Linn. Soc. Lond.*, 25 : 167.

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

**Diagnostic features** : Body slightly compressed with both ends tapering. Head diameter 30  $\mu\text{m}$ . Cuticle with distinct transverse striation about 5  $\mu\text{m}$  apart. A pair of reddish ocelli occur posterior to the base of the deep buccal cavity. Four cephalic setae 0.25 head diameter long. Amphid, cervical and somatic setae obscure. Lateral alae lacking, Oesophagus with well developed single cylindrical bulb. Intestine with numerous irregular oil globules. Tail conical-cylindrical. Caudal gland 5-celled. Spinnert present. Spicule in male cephalated and 30  $\mu\text{m}$  long. Gubernaculum short, simple and sleeve-like.

**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)

1888. *Spilophora paradoxa* De Man, *Mem. Soc. Zool. Fr.*, 1 : 45.

*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  $\mu\text{m}$ . Four cephalic setae 0.4 head diameter long. Buccal cavity deep and funnel-shaped. A solid dorsal tooth present. Few short cervical setae 3  $\mu\text{m}$  long present. Nerve ring 48%. Oesophageal bulb double, the anterior chamber being smaller than the posterior one. Excretory pore situated about 50  $\mu\text{m}$  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)

1865. *Spilophora robusta* Bastian, *Trans. Linn. Soc. Lond.*, 25 : 182.

*Material examined* : 2 ex., Kalpeni, 13.2.87; 1 ex., Kavarratti, 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  $\mu\text{m}$  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 coralline 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)

1952. *Synonchiella orcina* Gerlach, *Akad. Wiss. Abh. Mathem-Naturw. Kl.*, 6 : 317.

**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  $\mu$ m 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 on the coasts of Atlantic and Indian Oceans.

Family SELACHINEMATIDAE

Genus **Synonchium** Cobb, 1920

23. **Synonchium obtusum** Cobb

1920. *Synonchium obtusum* Cobb, *Contrib. Sci. Nemat.*, 9 : 290.

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

**Diagnostic features** : Cuticular punctation 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  $\mu$ m 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

1964. *Paracyatholaimus duplicatus* Gerlach, *Verof. Inst. Meeres. Bermerhaven*, 9 : 77.

*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  $\mu\text{m}$  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 SPIRINIIDAE

Genus *Metachromadora* Filipjev, 1918

25. *Metachromadora clavata* Gerlach

1967. *Metachromadora clavata* Gerlach, *Mitt. Zool. Mus. Berlin*, 33 : 431.

*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  $\mu\text{m}$  or 0.3 head diameter long. Numerous short somatic setae present. Amphid 10  $\mu\text{m}$  or 0.6 head diameter wide with 2 spirals. Buccal cavity 20  $\mu\text{m}$  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  $\mu\text{m}$  or 1.0 anal diameter long. Gubernaculum with pointed distal end and 15  $\mu\text{m}$  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

1953. *Chromaspirina madagascariensis* Gerlach, *Mem. Inst. Sci. Madagascar*, 8 : 82.

*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* : Madagascars, Maldives, Lakshadweep, India.

#### Genus *Spirinia* Gerlach, 1963

##### 27. *Spirinia laevioides* Gerlach

1963. *Spirinia laevioides* Gerlach, *Kieler Meeresforsch.*, 19 : 69.

*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

1918. *Desmodora megalosoma* Steiner, *Zool. Anz.*, 50 : 13.

*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  $\mu\text{m}$  or 0.5 head diameter wide in female and 15  $\mu\text{m}$  or 0.6 head diameter wide in male. Buccal cavity cylindrical and 40  $\mu\text{m}$  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)

1920. *Bulbonema brevicolle* Cobb, *Contrib. Sci. Nemat.*, 9 : 264.

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

*Diagnostic features* : Cuticular annulation deeply ringed and about 1  $\mu\text{m}$  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  $\mu\text{m}$  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 Gerlach (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)

1920. *Desmodora cinctum* Cobb, *Contrib. Sci. Nemat.*, 9 : 221.

*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  $\mu\text{m}$ , 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. *Desmodora conocephala* Steiner, *Zool. Anz.*, 50 : 11.

*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  $\mu\text{m}$  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.

Family MONOPOSTHIIDAE

Genus *Monoposthia* De Man, 1889

### 32. *Monoposthia costata* (Bastian)

1865. *Spilophora costata* Bastian, *Trans. Linn. Soc. Lond.*, 25 : 166.

*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.

1920. *Rhinema retrosum* Cobb, *Contrib. Sci. Nemat.*, 9 : 234.

*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* : Body with 96 coarse cuticular annules. Head conical. Four cephalic setae 1.0 head diameter long present. Amphid monospiral and 0.5 head diameter wide. Oesophagus with posterior cardiac bulb with double internal sclerotization. Paired ambulatory bristles absent. Few scattered somatic setae 10  $\mu$ m long. Ten pairs of ventral adhesive papillae present on annules 58-67. Sole conical. Spicule cephalated and 50  $\mu$ m long. Gubernaculum plate-like. Anus located in sixth annule from posterior end. Caudal gland present.

*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, 186935. **Eubostrichus exilis** (Cobb)

1920. *Eubostrichus exilis* Cobb, *Contrib. Sci. Nemat.*, 9 : 228.

**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, 186536. **Monhystera parva** (Bastian)

1865. *Monhystera parva* Bastian, *Trans. Linn. Soc. Lond.*, 25 : 98.

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

**Diagnostic features** : Cuticle smooth and transparent. Head diameter 15  $\mu\text{m}$ . Body diameter at the end of oesophagus 30  $\mu\text{m}$ . Lips and labial papillae distinct. Buccal cavity 15  $\mu\text{m}$  deep. Cephalic and cervical setae 5  $\mu\text{m}$  long present. Amphid distinct circular and 0.3 head diameter wide. Excretory pore 3.5 head diameters behind anterior end. Tail conical-cylindrical, with 3-celled caudal gland. Spinnert present. Spicule in male 40  $\mu\text{m}$  long and curved. Gubernaculum apophysis 14  $\mu\text{m}$  long.

**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, 186537. *Theristus setifer* Gerlach

1952. *Theristus setifer* Gerlach, *Abh. mathem. Naturv. Kl. Akad. Wiss.*, 6 : 315.

*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  $\mu\text{m}$  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, 192038. *Rhynchonema cinctum* Cobb

1920. *Rhynchonema cinctum* Cobb, *Contrib. Sci. Nemat.*, 9 : 260.

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

*Diagnostic features* : Cuticle coarsely ringed. Head diameter 5  $\mu\text{m}$ . Body diameter at the end of oesophagus 30  $\mu\text{m}$ . Buccal cavity cylindrical, 60  $\mu\text{m}$  long, extending upto the anterior end of amphid. Ten cephalic and 4 cervical setae 1.0 head diameter long present. Amphid circular, 4  $\mu\text{m}$  wide and located 60  $\mu\text{m}$  from anterior end. Numerous somatic setae 10–15  $\mu\text{m}$  long in longitudinal rows. Tail conical and setose. Caudal gland 3-celled. Spicule in male curved and 30  $\mu\text{m}$  long. Gubernaculum short, triangular and 12  $\mu\text{m}$  long.

*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, 195339. *Procamacolaimus tubifer* Gerlach

1953. *Procamacolaimus tubifer* Gerlach, *Mem. Inst. Sci. Madagascar*, 8 : 78.

*Material examined* : 4 ex., Kavaratti, 3.2.87.

**Diagnostic features** : Cuticle deeply annulated with rings 1.6  $\mu\text{m}$  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  $\mu\text{m}$  or about 1.5 anal diameters long. Six preanal papillae 10  $\mu\text{m}$  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

1935. *Camacolaimus prytherchi* Chitwood, *Proc. Helm. Soc. Washington*, 3 : 11.

**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  $\mu\text{m}$  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

1962. *Bathylaimus depressus* Gerlach, *Kieler Meeresforsch.*, 18 : 106.

**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

1920. *Cytolaimium exile* Cobb, *Contrib. Sci. Nemat.*, 19 : 274.

*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  $\mu$ m in diameter. Fine cilia 10-20  $\mu$ m long occur along the anterior border of head and lateral margins of the trunk. Ciliation forms a continuous field on the ventral surface.

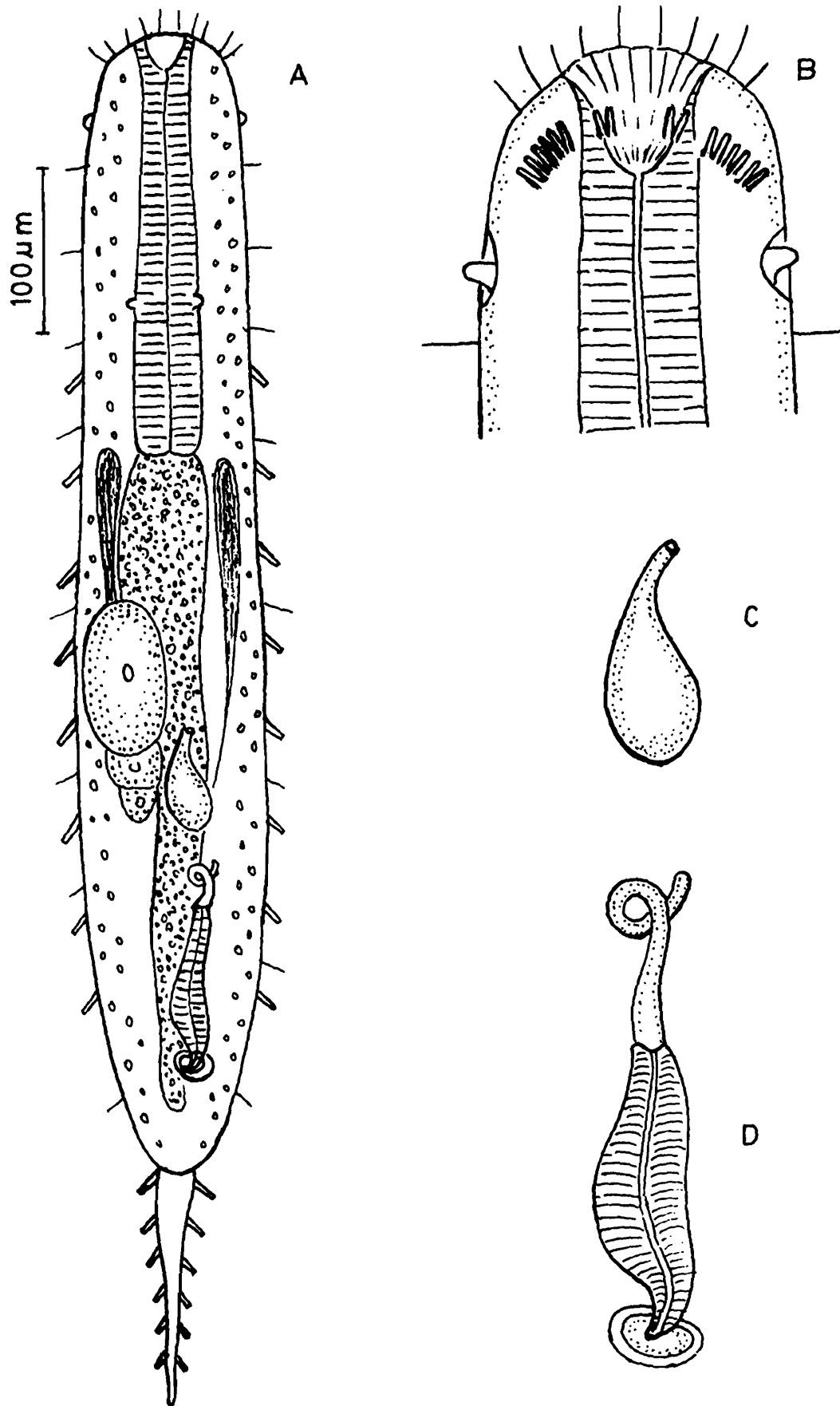


Fig. 1. *Macrodasys indica* n. sp.  
 A. Adult, ventral view; B. Anterior region, ventral view; C. Penis; D. Bursa copulatrix.

Adhesive tubes occur in anterior, lateral and posterior series. The anterior tubes are about 10  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$ . Bursa copulatrix is about 200  $\mu\text{m}$  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 *Macrodays* 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

1954. *Urodasys viviparus* Wilke, *Zool. Jb. (Syst.)*, 82 : 502.

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

*Diagnostic features* : Body elongate, vermiform and dorsoventrally flattened, with a long thread-like tail. Cuticle granular, thin and transparent. Dorsolateral epidermal glands present. Numerous lateral sensory bristles present. Numerous anterior, lateral and posterior adhesive tubes present. Pharynx forms 1/3 of the total gut length. Pharyngeal pores located at or about the mid-pharyngeal region. Developing embryo seen in mature specimens. Pestle organs present.

*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. *Acanthodasys aculeatus* Remane, *Zool. Jb. (Syst.)*, 54 : 203.

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

*Diagnostic features* : Body elongate, vermiform and dorsoventrally flattened, with both ends slightly tapering. Length and width ratio is around 10:1. Ventral ciliation uniform. Cuticular armature with nail-shaped unispined hooks excepting the anterior head region. Lateral epidermal glands present. Dorsolateral tubes 6-8 pairs. Caudal lobes with 2 adhesive tubes each. Pharynx forms 1/4 of the total gut length. Mouth terminal and inclined to the ventral surface. Pharyngeal pores inconspicuous at the posterior end of pharynx. Testes paired. Solitary dorsal ovary.

*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. *Thaumastoderma heideri* Remane, *Z. Morph. Okol.*, 5 : 625.

*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 pharynx. 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

##### 47. *Tetranchyroderma indica* Rao and Ganapati

1968. *Tetranchyroderma indica* Rao and Ganapati, *Proc. Ind. Acad. Sci.*, 67 : 46.

*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  $\mu\text{m}$  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  $\mu\text{m}$  and a width of 50  $\mu\text{m}$  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.

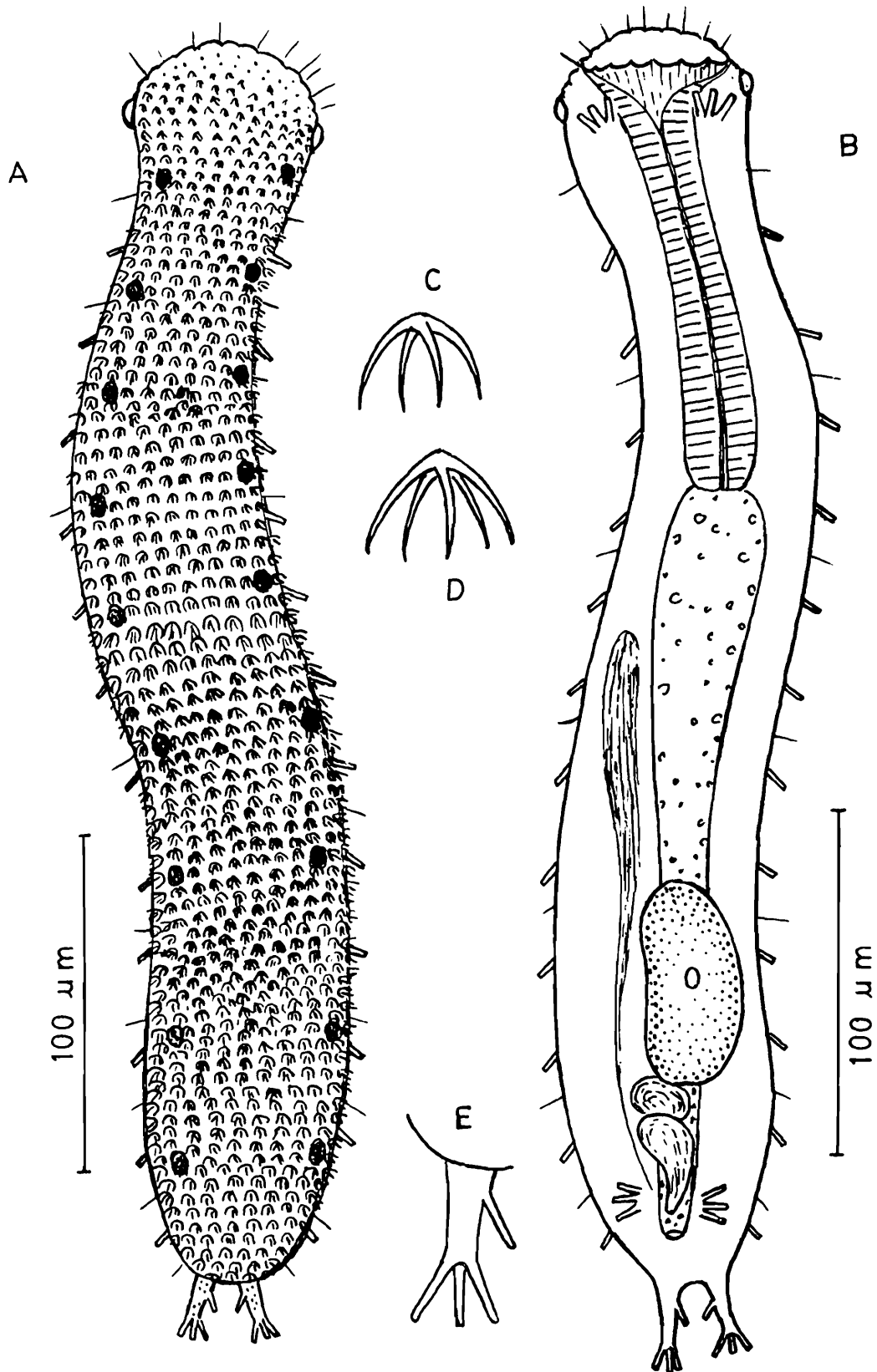


Fig. 2. *Tetranchyroderma paralittoralis* n. sp.  
 A. Adult, dorsal view; B. Adult, ventral view; C. Tetracre; D. Pentacre;  
 E. Posterior pedicle, dorsal view.

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  $\mu\text{m}$  in the anterior region and 3-5  $\mu\text{m}$  in the posterior region. There are 8-10 pairs of dorsolateral epidermal glands with reingent granular material. The glands are about 6-8  $\mu\text{m}$  in diameter. Short sensory cilia 6-12  $\mu\text{m}$  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  $\mu\text{m}$  in length on the ventral surface just behind the mouth. Twelve pairs of evenly spaced ventrolateral tubes measuring 8-10  $\mu\text{m}$  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  $\mu\text{m}$  in length. In addition, 3 pairs of posterior ventral tubes about 8  $\mu\text{m}$  in length are present close to the level of anus.

Anteriorly, the mouth is widely extensible, about 40  $\mu\text{m}$  wide and inclined slightly to the ventral surface. Pharynx is about 120  $\mu\text{m}$  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 an ovary. The linear testis located on the right side extends upto half the length of the body. One dorsal ovum about 60  $\mu\text{m}$  in maximum diameter was observed in the last 1/3 part of the body. Receptaculum seminis is small, 15  $\mu\text{m}$  long and bladder-like. Bursa copulatrix lies behind the receptaculum, 30  $\mu\text{m}$  long, pitcher-shaped and opens on the ventral surface just behind the male genital aperture and before the anal aperture.

*Remarks* : The genus *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, *T paralittoralis* n. sp. closely approaches *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 *T paradoxa*, the tentacles and pentancres alternate in their disposition.

*Diagnostic features* : Body upto 380  $\mu\text{m}$  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 posteroventral 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  $\mu\text{m}$  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

49. *Pseudostomella indica* Rao

1970. *Pseudostomella indica* Rao, *Cah. Biol. Mar.*, 11 : 115.

*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

Genus *Dactylopodola* Strand, 1929

50. *Dactylopodola indica* (Rao and Ganapati)

1968. *Dactylopodalia indica* Rao and Ganapati, *Proc. Ind. Acad. Sci.*, 67 : 45.

*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  $\mu\text{m}$  including caudal lobes and a maximum width of 70  $\mu\text{m}$ . Body is elongated, strap-shaped, widest in the middle region and slightly tapers towards the posterior end. Head is 60  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  in maximum diameter. A circumcephalic ring of cilia measuring 10-12  $\mu\text{m}$  in length occur on the head. Anteriorly, the head bears short sensory cilia 6-8  $\mu\text{m}$  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  $\mu\text{m}$  long occur on well developed and extensible ventrolateral feet located behind the circumcephalic ciliary girdle. Twelve pairs of ventrolateral tubes measuring about 10  $\mu\text{m}$  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  $\mu\text{m}$  in length occur in a bilateral symmetry behind the circumcephalic 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  $\mu\text{m}$  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  $\mu\text{m}$  wide, slightly inclined to the ventral surface and encircled by a corona of short sensory setae 3-4  $\mu\text{m}$  long. Buccal cavity is small and conical. Pharynx is about 150  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  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

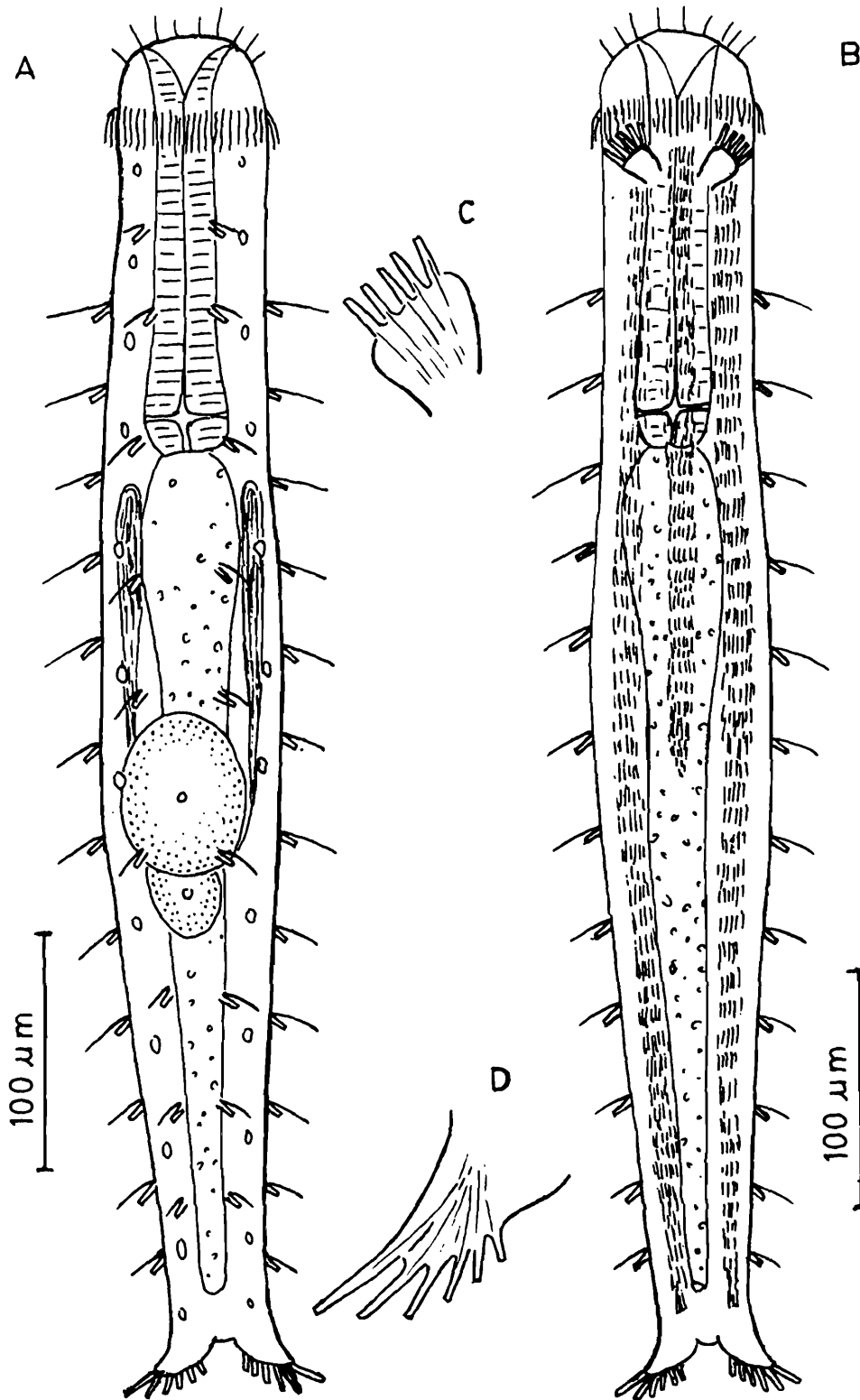


Fig. 3. *Turbanella aminensis* n. sp.  
 A. Adult, dorsal view; B. Adult, ventral view; C. Anterior adhesive foot;  
 D. Posterior caudal lobe.

lacking sensory bristles at their tips.

**Diagnostic features** : Body up to 550  $\mu\text{m}$  in length and 70  $\mu\text{m}$  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  $2\frac{1}{2}$  longitudinal bands. Pharynx occupies less than  $\frac{1}{3}$  of the total gut length. Pharyngeal pores conspicuous at the posterior end of pharynx.

**Holotype** : Specimen 540  $\mu\text{m}$  long with gonads collected by the author on 27.2.1983. Deposited in the National Zoological Collections, Z.S.I., Calcutta. Regd. No. P 801/1.

**Type locality** : Medium coralline sand with little detritus 10 cm below surface between low and half-tide levels, intertidal zone, Amini (Lat.  $11^{\circ}07'N$  and Long.  $72^{\circ}44'E$ ), 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  $\mu\text{m}$  including caudal lobes and a maximum width of 85  $\mu\text{m}$ . 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  $\mu\text{m}$  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  $\mu\text{m}$  in length. Between the two caudal lobes occurs a median anal cone about 6  $\mu\text{m}$  in length.

The cuticle is smooth, thin and transparent. Eight to ten pairs of dorsolateral epidermal glands 6  $\mu\text{m}$  in maximum diameter occur extending between the head and the tail. The ventral ciliation occurs in two lateral longitudinal bands. Sensory bristles 10-15  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  and 20  $\mu\text{m}$ , respectively. Each caudal lobe supports 5 posterior adhesive tubes, the outer ones being longer than the inner ones. The tubes measure 10-15  $\mu\text{m}$  in length.

The mouth is 15  $\mu\text{m}$  wide and terminal. The buccal cavity is spacious and cylindrical with a lining of thick cuticularised walls. The cavity measures 30 x 24  $\mu\text{m}$  in size. The pharynx is about 210  $\mu\text{m}$  long and occupies nearly  $\frac{1}{3}$  of the total gut length. The

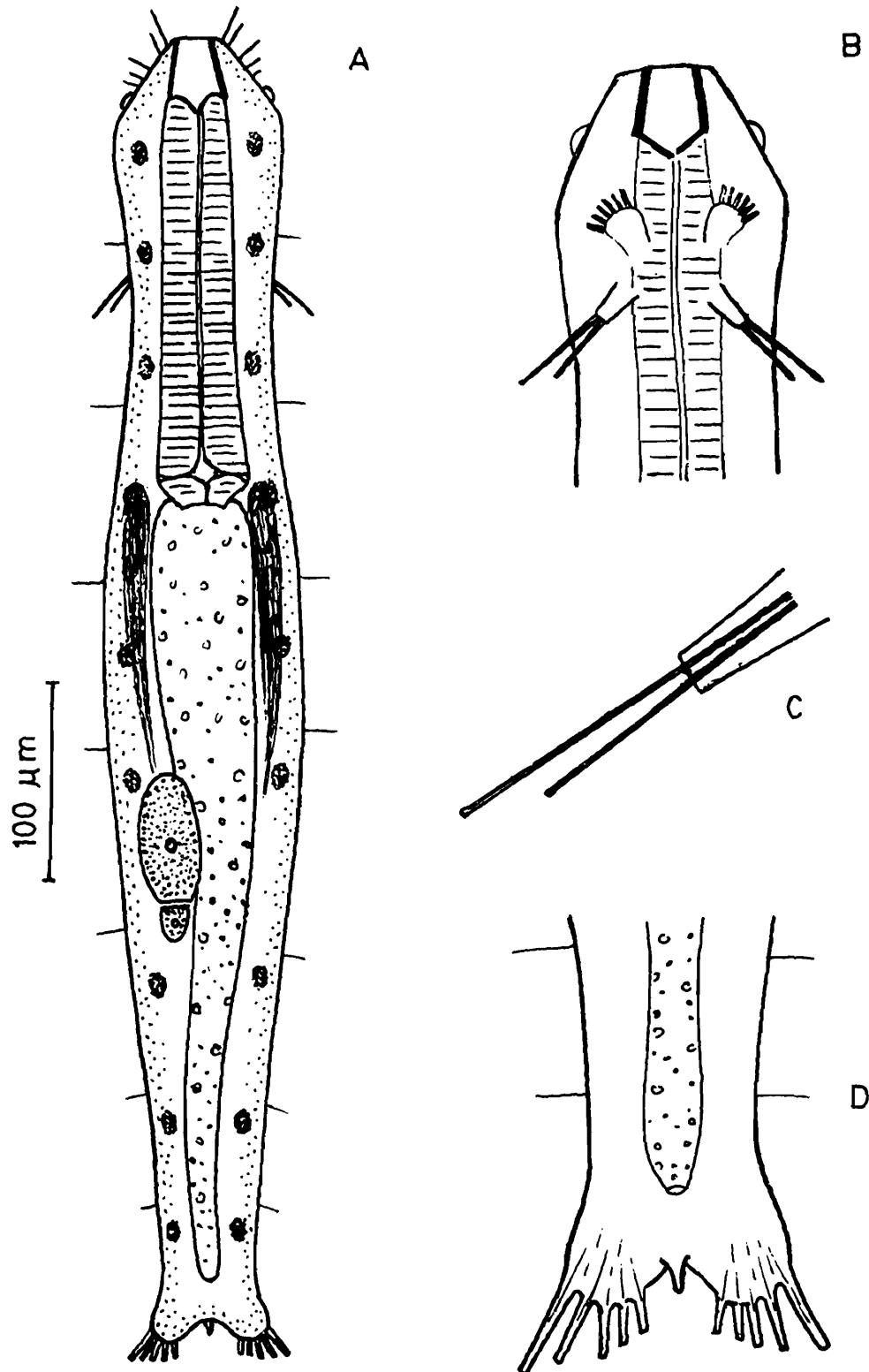


Fig. 4. *Paraturbanella brevicaudatus* n. sp.  
 A. Adult, dorsal view; B. Anterior region, ventral view; C. Lateral adhesive tubes; D. Posterior region, ventral view.

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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  long and 85  $\mu\text{m}$  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  $\mu\text{m}$  long, with ova and sperm, collected by the author on 19.2.1983. Deposited in the National Zoological Collections, Z.S.I., Calcutta. Regd. 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

1927. *Xenotrichula velox* Remane, *Zool. Anz.*, 71 : 289.

**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  $\mu\text{m}$  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 peduncles. 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

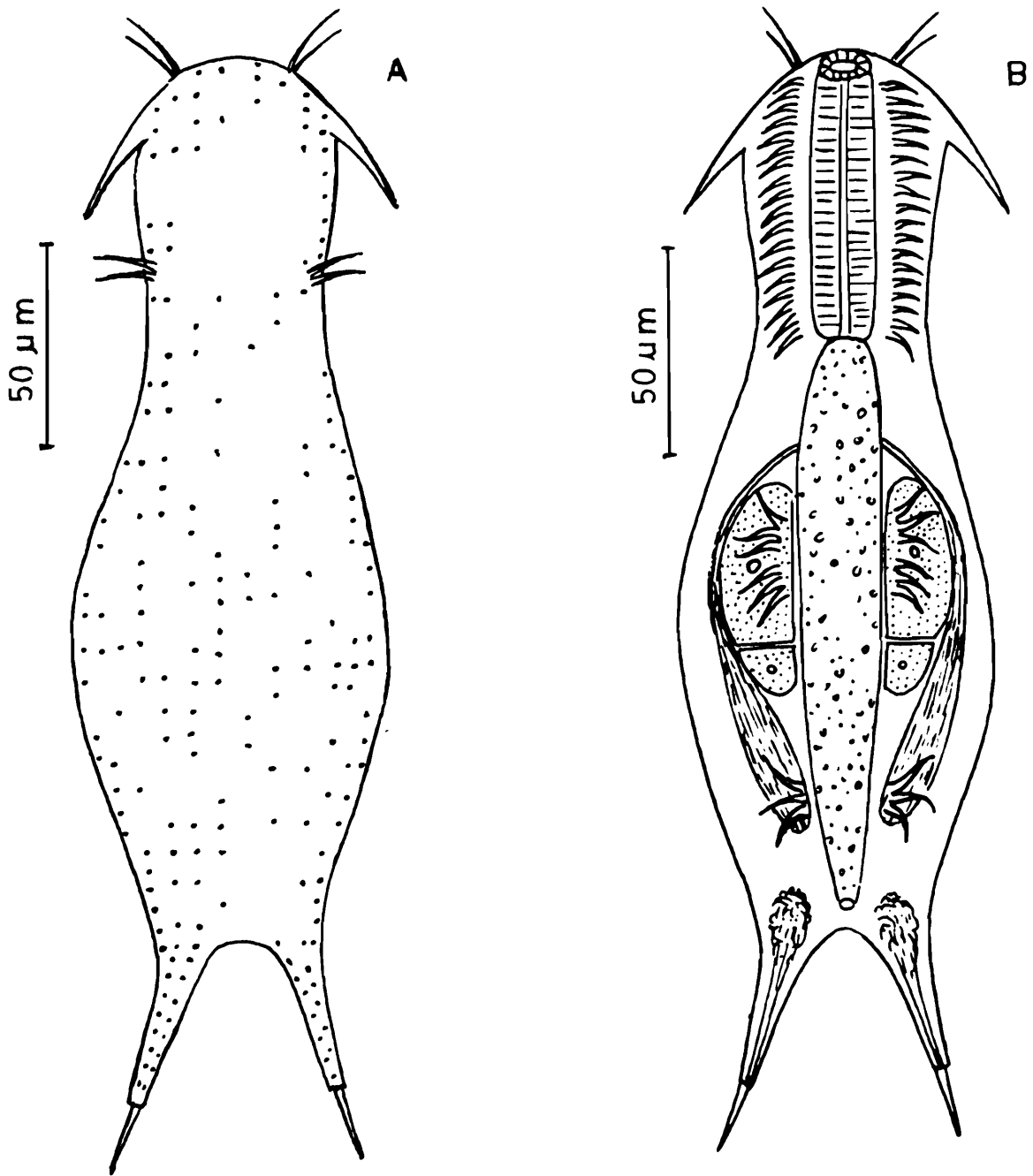


Fig. 5. *Xenotrichula laccadivensis* n. sp.  
A. Adult, dorsal view; B. Adult, ventral view.

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  $\mu\text{m}$  long excluding caudal furca and 60-70  $\mu\text{m}$  in maximum width. Head bears 2 pairs of sensory bristles and a pair of posteriorly directed tentacles 20-25  $\mu\text{m}$  long. Two pairs of dorsolateral sensory cirri about 10  $\mu\text{m}$  long occur on neck region. Tail forks 30-35  $\mu\text{m}$  long with adhesive tubes 15  $\mu\text{m}$  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  $\mu\text{m}$  long and occupies 1/3 of the total gut length. Gonads are paired and symmetrical on either side of the gut.

**Holotype** : Specimen 210  $\mu\text{m}$  long with ova and sperm, collected by the author on 19.2.1983. Deposited in the National Zoological Collections, Z.S.I., Calcutta. Regd. No. P 803/1.

**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

1954. *Chaetonotus atrox* Wilke, *Zool. Jb. (Syst.)*, 82 : 527.

**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  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$ , excluding caudal furca and a maximum width of 40-45  $\mu\text{m}$ . Body is typically of chaetonotoid appearance, with a distinct head, neck, trunk and caudal furca. The head is 5-lobed, 30-35  $\mu\text{m}$  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  $\mu\text{m}$  long. The neck is about 30  $\mu\text{m}$  at its maximum width. Trunk is widest in the mid body region. Caudal furca are conical, 20  $\mu\text{m}$  long and carry an adhesive tube 10  $\mu\text{m}$  long. In relaxed specimens, the furca are 25  $\mu\text{m}$  apart between their distal ends.

The cuticular armature consists of simple spines arising from triradiate scales 3-6  $\mu\text{m}$  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  $\mu\text{m}$  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  $\mu\text{m}$  in width and inclined to the ventral surface. Pharynx is 40  $\mu\text{m}$  long, with a distinct posterior bulb. The gut following the pharynx is undifferentiated and 95  $\mu\text{m}$  long. Anus is subterminal and opens on the dorsal surface 5  $\mu\text{m}$  from the posterior border. A single dorsal ovum 45 x 30  $\mu\text{m}$  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  $\mu\text{m}$  long excluding caudal furca and 40-45  $\mu\text{m}$  in maximum width. Head 5-lobed and bears 4 groups of tactile cilia 15-20  $\mu\text{m}$  long. The tail forks are conical, 20  $\mu\text{m}$  long and carry adhesive tubes 10  $\mu\text{m}$  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  $\mu\text{m}$  long with a distinct posterior region. Pharynx 40  $\mu\text{m}$  long with a distinct posterior bulb.

**Holotype** : Specimen 140  $\mu\text{m}$  long, collected by the author on 8.2.1987. Deposited in the National Zoological Collections, Z.S.I., Calcutta. Regd. No. P 804/1.

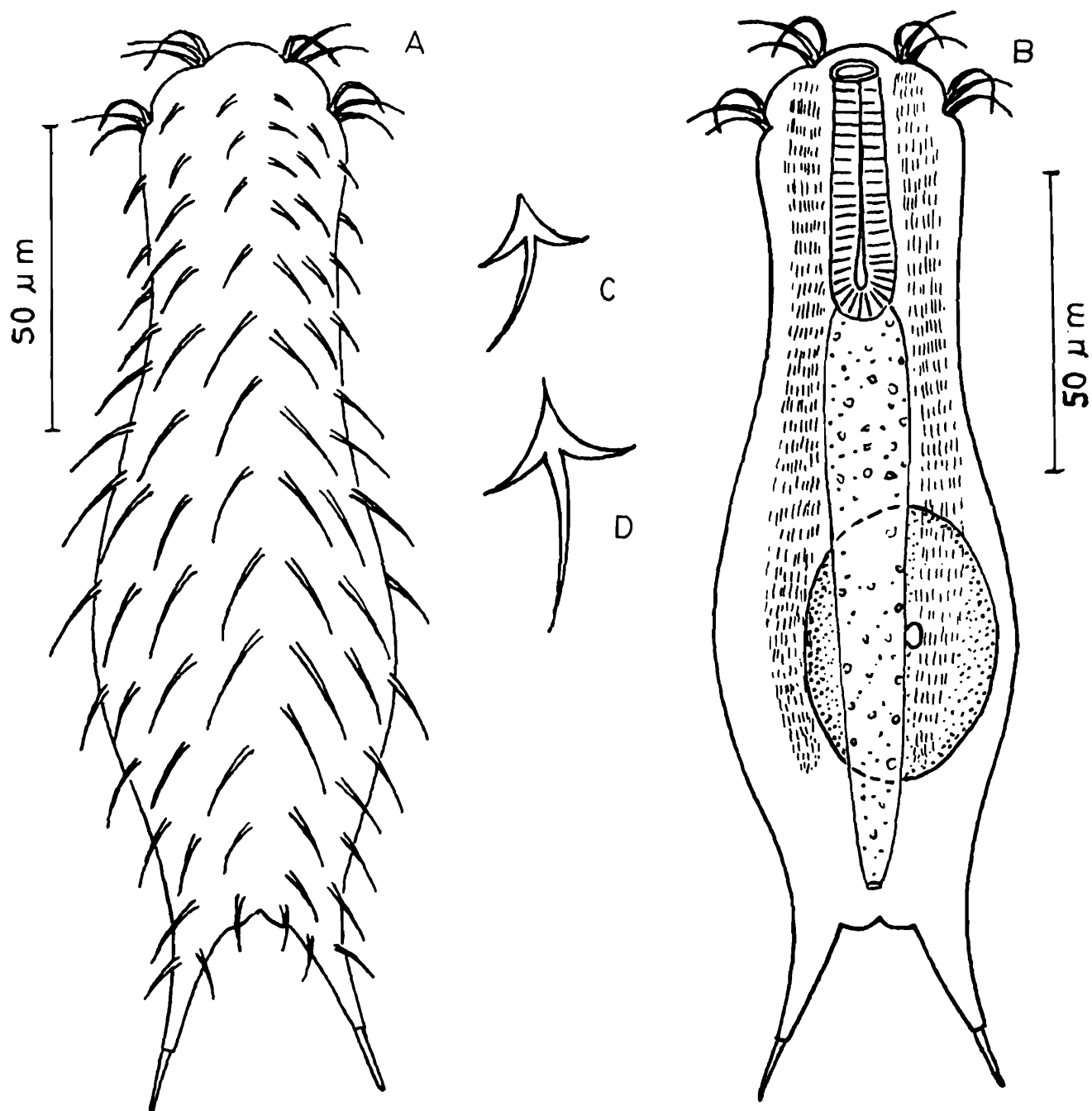


Fig. 6. *Chaetonotus triradiatus* n. sp.  
A. Adult, dorsal view; B. Adult, ventral view; C. Anterior scale; D. Posterior sacle.

*Type locality* : Fine and medium sand with little detritus 5 cm below surface between low and mid-water levels, intertidal zone, Agatti (Lat. 10°51'N and Long. 72°11'E), Lakshadweep, India.

57. *Chaetonotus* 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  $\mu$ m long. Dorsal body surface covered with triangular scales 5  $\mu$ m long in 12 longitudinal rows. The spines which project from central part of scales are 6-8  $\mu$ m 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.

Genus *Aspidophorus* Vogt, 1904

58. *Aspidophorus marinus* Remane

1926. *Aspidophorus marinus* Remane, *Zool. Anz.*, 66 : 243.

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

*Diagnostic features* : Chaetonotod 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  $\mu$ m 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  $\mu$ m 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.

Phylum KINORHYNCHA  
 Class CYCLORHAGEA  
 Order NOMOSOMATIDA  
 Family ECHINODERIDAE  
 Genus *Echinoderes* Claparede, 1863

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  $\mu\text{m}$ .

*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  $\mu\text{m}$  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  $\mu\text{m}$ .

*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	CONCHROHAGIDA
Family	CATERIIDAE
Genus	Cateria Gerlach, 1956

#### 61. *Cateria gerlachi* Higgins

1968. *Cateria gerlachi* Higgins, *Trans. Amer. Micro. Soc.*, 87 : 21.

*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

1944. *Polygordius madrasensis* Aiyar and Alikunhi, *Proc. Nat. Inst. Sci. India*, 10 : 113.

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

*Diagnostic features* : Body white in colour with 40-60 segments externally indistinct. Hypodermal glands well developed. External ciliation absent. Head distinct with triangular anterior portion and broad posterior part. Two moderately long cephalic tentacles present. Eyes absent. Pygidium swollen with a pair of anal cirri shorter than cephalic tentacles. Anal lobes absent. Adhesive glands occur around pygidium in a band. Sexes separate. Gonads develop from fifteenth segment onwards. Highly thigmotactic.

*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

1944. *Polygordius uroviridis* Aiyar and Alikunhi, *Proc. Nat. Inst. Sci. India*, 10 : 118.

*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 palpcils 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

1944. *Protodrilus indicus* Aiyar & Alikunhi, *Proc. Nat. Inst. Sci. Indica*, 44 : 126.

*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.

*Diagnostic features* : Body transparent and attenuated posteriorly. Number of segments vary between 20 and 30. Cuticle thin and devoid of external ornamentation. Hypodermal glands few and spindle-shaped. Head not swollen, indistinct, with 2 long cephalic tentacles, 2 statocysts and 4 incomplete ciliary bands. Eyes absent. Nuchal organs conspicuous behind the tentacles as linear depressions with bunches of long cilia. Pygidium deeply bifurcated with 2 long adhesive anal lobes. Ventral groove is deep. Macrotype nephridia develop from second segment backwards. Sexes separate. Gonads develop from tenth segment backwards.

*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

1944. *Protodrilus pierantonii* Aiyar and Alikunhi, *Proc. Nat. Inst. Sci. India*, 10 : 121.

*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 not 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

1944. *Saccocirrus minor* Aiyar and Alikunhi, *Proc. Nat. Inst. Sci. India*, 10 : 129.

*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 nuchal 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

shows definite sculptured appearance on dorsal side. Sexes separate. Reproductive organs complicated. Gonads develop in middle and posterior segments. Sperm sacs occur in lateral chambers of body cavity. Penis swollen in the middle with supporting cuticular rods.

*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, Malayasia.

#### 68. *Saccocirrus orientalis* Alikunhi

1946. *Saccocirrus orientalis* Alikunhi, *Curr. Sci.*, 15 : 140.

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

1948. *Saccocirrus krusadensis* Alikunhi, *Proc. natn. Inst. Sci. India*, 14 : 373.

*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

lobes. Each caudal lobe bears 5-8 rows of ventral adhesive papillae. Anal cirri absent. Pharyngeal ventral muscular pad present. Parapodia with 3 types of setae *viz.*, long papillary setae with bifurcate tips, medium setae with broad tips and short setae with blunt tips. Bifid tip of long setae asymmetrical. Sexes separate. Gonads developed only on the left side of the digestive tract, from twenty fourth segment backwards.

*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).

Family DINOPHILIDAE

Genus *Dinophilus* Schmidt, 1848

#### 70. *Dinophilus gyrociliatus* (Schmidt)

1944. *Dinophilus gyrociliatus* Jagersten, *King. Svenka Venska. Handl.*, 21 : 15.

*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. Epipelagic 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 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.

Genus *Diurodrilus* Remane, 1925

#### 71. *Diurodrilus benazzii* Gerlach

1952. *Diurodrilus benazzii* Gerlach, *Zool. Anz.*, 149 : 185.

*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 0.04mm.

**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

trunk. Two slender cephalic tentacles and 2 ciliated palps present. Eyes and nuchal organs absent. Eight setigerous trunk segments including the pharyngeal segment with distinct dorsal cirri and simple capillary setae. Pygidial segment without dorsal cirri. Pygidium with 2 long and two-jointed anal cirri. The parent carries a large solitary egg towed to the posterior end of pygidium. Mouth ventral and subterminal. Buccal cavity deep. Digestive tract undifferentiated. Anus terminal on the pygidial segment. Gonads not observed.

*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 PISIONIDAE  
Genus *Pisione* Grube, 1856

#### 74. *Pisione gopalai* (Alikunhi)

1941. *Praegeria gopalai* Alikunhi, *Proc. Ind. Acad. Sci.*, 13 : 193.

*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

1947. *Pisione complexa* Alikunhi, *Proc. nat. Inst. Sci. India*, 10 : 113.

*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

1963. *Pisione africana* Day, *Bull. Br. Mus. Nat. Hist., Zool.*, 10 : 385.

*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)

1940. *Pisionella indica* Aiyar and Alikunhi, *Rec. Ind. Mus.*, 42 : 89.

*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* Mecznirow, 1865

#### 78. *Microphthalmus urofrimbriatus* Alikunhi

1948. *Microphthalmus urofrimbriatus* Alikunhi, *Jour. Roy. Asia. Soc. Bengal*, 14 : 17.

**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

1937. *Hesionides arenarius* Friedrich, *Kieler Meeresforsch.*, 1 : 343.

**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.

**Diagnostic features** : Minute worms with 15-18 setigerous segments. Head with a median and 2 pairs of dorsal and ventral tentacles. Three pairs of tentacular cirri. Notopodia with elongated dorsal cirri. Two acicula occur in neuropodium. Pygidium with two distinctly separated and fan-shaped anal lamellae. Two long thread-like anal cirri present. Anal lamellae are thigmotactic giving firm hold on substratum. Body largely transparent and brown in colour.

**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

1960. *Hesionides gohari* Hartmann-Schroder, *Kieler Meeresfosch.*, 16 : 74.

*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.

*Diagnostic features* : Small worms with 12-15 setigerous segments. Dorsal and ventral tentacles nearly equal. First tentacular cirri the longest. Parapodia with 2 simple notosetae of unequal size. Pygidium with an anal plate undivided at the base, but divided distally into 2 lamellae. Two long anal cirri present. Anal lamellae are glandular and highly thigmotactic. Male genital pore located in front of median tentacle. Two vesiculae in fourth setigerous segment. Body transparent and brown in colour.

*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

1977. *Hesionides minima* Westheide and Rao, *Cah. Biol. Mar.*, 18 : 278.

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

*Diagnostic features* : Minute worms with 12-16 setigerous segments. Anterior end with 11 appendages. Ventral tentacles directed laterally. Neurosetae bidentate. Pygidium with 2 small stump-shaped adhesive lamellae united at the base and distally broadened into semicircular lappets. Anal cirri are thread-like with swollen bases. Pygidial lamellae are thigmotactic by which the worm sticks to the substratum. Pharynx with 3 folds and 10 tapering papillae. Female oocytes extend from fifth setigern backwards. Male sperm thread-like. Body transparent and dark-green in colour.

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

*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

compound neurosetae with unidentate terminal blades unequal in length. Pharynx with 15 terminal papillae anteriorly. Sexes separate. Openings of male genital ducts occur anteriorly. Sexes separate. Openings of male genital ducts occur anteriorly near the median cephalic tentacle. Body transparent and light-grey in colour. Weakly thigmotactic and agile.

*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)

1914. *Eteone elongata* Southern, *Proc. Roy. Irish. Acad.*, 31 : 18.

*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

1958. *Eusyllis homocirrata* Hartmann-Schroder, *Kieler Meeresforsch.*, 14 : 235.

*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

2 simple supporting setae and 4 compound setae with expanded blades. Pygidium with 2 long anal cirri. Proboscis with an anterior tooth and undulated lamella. Gizzard with 22 rings occupying third to fifth setigerous segments. Weakly thigmotactic.

*Measurements* : Length 1.2mm and width 0.1mm.

*Remarks* : The tentacular cirri are slightly longer in the local specimens compared to the original description of the species.

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

*Distribution* : Circumtropical.

### Genus *Typosyllis* Langerhans, 1879

#### 85. *Typosyllis variegata* (Grube)

1860. *Syllis variegata* Grube, *Arch. Naturgesch.*, 26 : 85.

*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 1.2mm and width 0.16mm.

*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, 186387. *Sphaerosyllis minima* Hartmann-Schroder

1960. *Sphaerosyllis minima* Hartmann-Schroder, *Kieler Meeresforsch.*, 16 : 104.

*Material examined* : 1 ex., Kiltan, 3.3.83.

*Diagnostic features* : Minute worms with 10 setigerous segments. Prostomium with 2 pairs of eyes, 2 conical palps, 3 tentacles and a pair of tentacular cirri. Tentacles and cirri are club-shaped. Parapodia with one simple and 4 compound setae. Dorsal cirri long and club-shaped. Ventral cirri finger-like and longer than parapodia. Pygidium without parapodia, but with 2 club-shaped anal cirri. Pharynx with an anterior conical tooth. Gizzard with 10-12 transverse rings extending between fourth and fifth setigerous segments. Body opaque and dark grey in colour.

*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

1966. *Sphaerosyllis bengalensis* Rao and Ganapati, *Proc. Ind. Acad. Sci.* 58 : 309.

*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, 186589. *Brania subterranea* (Hartmann-Schroder)

1956. *Pionosyllis subterranea* Hartmann-Schroder, *Zool. Anz.*, 157 : 89.

*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

with a dorsal membrane. Parapodia with long dorsal cirri. Each parapodium with 12 short setae bearing serrated terminal blades. Two pairs of eyes present, the anterior ones being larger in size. Pharynx with anterior conical tooth. Gizzard cylindrical with 20-22 rings. All tentacles and cirri are club-shaped. Pygidium with 2 long, club-shaped anal cirri. Sexes separate. Gravid female with 10-12 lateral egg sacs on 12-22 setigerous segments. Body transparent and contractile.

*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.

#### Genus *Petitia* Siewing, 1955

##### 90. *Petitia amphophthalma* Siewing

1955. *Petitia amphophthalma* Siewing, *Vie et Milieu*, 6 : 413.

*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 cirrus, 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.

#### Genus *Ehlersia* Quatrefages, 1865

##### 91. *Ehlersia cornuta* (Rathke)

1932. *Syllis (Ehlersia) cornuta* Rathke, *Fauna de France*, 5 : 267.

*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.

### 92. *Goniadides aciculata* Hartmann-Schorder

1960. *Goniadides aciculata* Hartmann-Schorder, *Kieler Meeresforsch.*, 16 : 116.

**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 4.5mm and width 0.3mm.

**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

### 93. *Longipedia weberi* Scott

1909. *Longipedia weberi* Scott, *Siboga Exped.*, 29 : 196.

**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.

**Diagnostic features** : Body fusiform. Rostrum large. Anal operculum well developed. Antennule 6-segmented, with 4 aesthetes. Exopod of antenna 8-segmented. Exopod of mandible 3-segmented. Maxilliped not prehensile. P.1-P.4 with both rami 3-segmented. Setae highly plumose. Second exopod segment of P.1 with a modified seta. Second segment of endopod of P.2 with one minute seta on posterior surface. Third endopod segment of P.2 extremely elongate and 4 times longer than the first two segments. P.5 distinctly biramous with 2 plumose setae on basendopod and 6 naked setae on exopod. P.5 in male with one plumose seta on basendopod. Caudal ramus as long as broad with 2 developed terminal setae. Abdomen spinules extremely elongate. Intercoxal plates of P.1-P.4 highly ornamented.

**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

1980. *Longipedia kikuchii*, Ito, *J. Nat. Hist.*, 14 : 18.

**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.

Family CANUELLIADAE

Genus *Scottolana* Por, 1967

95. *Scottolana longipes* (Thompson and Scott)

1903. *Sunaristes longipes* Thompson and Scott, *Rep. Govt. Ceylon Pearl Oyster Fish. Gulf. Manaar*, 1 : 256.

*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.

*Distribution* : Sri Lanka, Andamans, Lakshadweep, Mozambique, Isreal.

Family ECTINOSOMATIDAE

Genus *Ectinosoma* Boeck, 1864

96. *Ectinosoma melaniceps* Boeck

1864. *Ectinosoma melaniceps* Boeck, *Forh. Vidensk. Krist.*, 1864 : 254.

*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

##### 97. *Halectinosoma langi* Wells

1965. *Halectinosoma langi* Wells, *Trans. Roy. Soc. Enib.*, 67 : 230.

*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

##### 98. *Arenosetella germanica* Kunz

1937. *Arenosetella germanica* Kunz, *Kieler Meeresforsch.*, 2 : 95.

*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)

1967. *Noodtiella intermedia* Wells, *Trans. R. Soc. Endinb.*, 67 : 245.

**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 leptoderma* (Klie)

1929. *Ectinosoma leptoderma* Klie, *Zool. Jb. (Syst.)*, 57 : 335.

**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 HARPACTICIDAE

Genus *Harpacticus* Milne-Edwards, 1840

101. *Harpacticus gracilis* Claus

1863. *Harpacticus gracilis* Claus, *Die Freilebenden Copepoden der Fauna Deutschlands*, 1 : 67.

*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 0.58mm.

*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

1967. *Tisbisoma triarticulatum* Wells *Trans. R. Soc. Edinb.*, 67 : 254.

*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.

Family PORCELLIDIIDAE

Genus *Porcellidium* Claus, 1860

103. *Porcellidium ravanae* Thompson and Scott

1903. *Porcellidium ravanae* Thompson and Scott, *Rep. Govt. Ceylon Pearl Oyster Fish. Gulf Manaar*, 1 : 275.

*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 spinulose 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.

Family PELTIDIIDAE

Genus *Peltidium* Philippi, 1839

104. *Peltidium ovale* Thompson and Scott

1903. *Peltidium ovale* Thompson and Scott, *Rep. Govt. Ceylon Pearl Oyster Fish. Gulf Manaar*, 1 : 275.

*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

1903. *Peltidium angulatum* Thompson and Scott, *Rep. Govt. Ceylon Pearl. Oyster Fish. Gulf Manaar*, 1 : 273.

*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.

Family THALESTRIDAE

Genus *Phyllothalestris* Sars, 1905

### 106. *Phyllothalestris mysis* (Claus)

1863. *Thalestris mysis* Claus, *Die freilebenden Copepoden*, 1 : 130.

*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 0.8mm.

*Remarks* : The three known species of the genus *Phyllothalestris*, viz., *P. mysis* (Claus), *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

#### 107. *Rhynchothalestris rufocincta* (Brady)

1880. *Thalestris rufocincta* Brady, *A monograph of British Copepoda*, 2 : 125.

*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

#### 108. *Diarthrodes cystoecus* Fahrenbach

1954. *Diarthrodes cystoecus* Fahrenbach, *J. Wash. Acad. Sci.* 44 : 326.

*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 a lappets.

**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 *Eudactylopus* Scott, 1909

##### 109. *Eudactylopus andrewi* Sewell

1940. *Eudactylopus andrewi* Sewell, *Scient. Rep. John Murray Exped.*, 7 : 202.

**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 spinules 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 spinules 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, Caroline Islands, Xisha Islands, China and Japan.

Genus *Idomene* Lang, 1948110. *Idomene maldivae* (Sewell)

1940. *Xouthous maldivae* Sewell, *Scient. Rep. John. Murray Exped.*, 7 : 198.

*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 *Parastenhelia* Thompson and Scott, 1903111. *Parastenhelia hornelli* Thompson and Scott

1903. *Parastenhelia hornelli* Thompson and Scott, *Rep. Govt. Ceylon Pearl Oyster Fish.*, 1 : 263.

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

*Diagnostic features* : Body elongated. Rostrum pointed apically. Anal operculum simple and naked. Caudal ramus broader than long with 2 developed apical setae. Antennule 9-segmented with an aesthete on fourth segment. Exopod of antenna 2-segmented. Maxilliped prehensile with a terminal claw. Endopod of P.1 with 2 segments, the second one being quite small with 2 long terminal claws. Exopod short and 3-segmented. P.2–P.4 with both rami 3-segmented. P.5 in male with outer segment composed of 3 joints.

*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

1940. *Diosaccus monardi* Sewell, *Scient. Rep. John Murray Exped.*, 7 : 244.

*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

1928. *Stenhelia polluta* Monard, *Arch. Zool. exp. gen.*, 67 : 399.

*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

1971. *Stenhelia madrasensis* Wells, *J. nat. Hist.*, 5 : 508.

*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)

1894. *Robertsonia proprinqua* Scott, *Trans. Linn. Soc. Long.*, 6 : 99.

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

*Diagnostic features* : Body linear and depressed. Rostrum distinct. Abdomen with dense spinules. Antennule 5-segmented with an aesthete on third segment. Exopod of antenna 2-segmented. Exopod of mandible with 4 setae. Basis of maxillule with 5 setae. Endopod of maxilla 3-segmented. First endopod segment of P.1 as long as the entire exopod. First exopod segment of P.1 as long as the entire exopod. First exopod segment of P.2-P.4 with an inner seta. Inner setae of basendopod of P.5 stout and bifid. Caudal ramus longer than wide with 2 developed terminal setae, the inner one being the longest.

*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)

1940. *Laophonte adduensis* Sewell, *Scient. Rep. John Murray Exped.*, 7 : 314.

*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)

1935. *Amphiascus subdebilis* Willey, *Ann. Mag. Nat. Hist.*, 10 : 64.

*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)

1866. *Amphiascus cinctus* Claus, *Schr. ges. Befr. Ges. Naturw. Marburg*, 1 : 27.

*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)

1940. *Amphiascus nicobaricus* Sewell, *Scient. Rep. John Murray Exped.* 7 : 252.

*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.

### Genus *Haloschizopera* Lang, 1948

#### 120. *Haloschizopera tenuipes* Noodt

1964. *Haloschizopera tenuipes* Noodt, *Kieler Meeresforsch.*, 20 : 138.

*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.

### Family METIDAE

#### Genus *Metis* Philippi, 1840.

#### 121. *Metis jusseaumei* (Richard)

1893. *Illyopsyllus jusseaumei* Richard, *Rev. Biol. Nord. France*, 5 : 69.

*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.

Family AMEIRIDAE

Genus *Ameira* Boeck, 1864

#### 122. *Ameira parvula* (Claus)

1866. *Canthocamptus parvula* Claus, *Schr. Ges. Beford, ges. Naturw. Marburg*, 1 : 30.

*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.

Genus *Sicameira* Klie, 1950

#### 123. *Sicameira langi* Rao

1972. *Sicameira langi* Rao *Cah. Biol. Mar.*, 13 : 316.

*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

1954. *Nitocra affinis rijekana* Petkovski, *Acta Mus. Macee, Sci. Natur.*, 2 : 104.

*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

1967. *Paraleptomesochra minima* Wells, *Trans. Roy. Soc. Edinb.*, 67 : :297.

*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.

#### Genus *Parapseudoleptomesochra* Lang, 1965

##### 126. *Parapseudoleptomesochra trisetosa* (Krishnaswamy)

1957. *Ameira trisetosa* Krishnaswamy, *Studies on Copepoda of Madras*, 230.

*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.

Family PARAMESOCHRIDAE

Genus *Kliopsyllus* Kunz, 1962

##### 127. *Kliopsyllus wilsoni* (Krishnaswamy)

1957. *Paramesochra wilsoni* Krishnaswamy, *Studies on the Copepoda of Madras*, 114.

*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.

#### 128. *Kliopsyllus psammophilus* (Noodt)

1964. *Paramesochra psammophila* Noodt, *Kieler Meeresforsch.*, 20 : 145.

*Material examined* : 2 ex., Bangaram, 10.2.87.

*Diagnostic features*: Body depressed dorsoventrally and tapers to the posterior end. Cephalothorax anteriorly rounded. Anal operculum present. Caudal ramus 2.5 times longer than broad, with 2 developed setae. Antennule short and 8-segmented, with an aesthete on fourth segment. Exopod of antenna 1-segmented, with 1 terminal and 2 lateral setae. Maxilliped prehensile. Rami of P.1 are 2-segmented. Rami of P.2–P.4 with exopod 3-segmented and endopod 1-segmented. Endopod of P.4 bears a modified seta. Inner expansion of P.5 with 2 setae; exopod oval with 3 setae. P.6 in male is a transverse lappet with a seta.

*Measurements* : Length 0.28–0.30 mm.

*Remarks* : The present specimens agree well with the original description of the species in all the essential features. This is the first record of the species from Indian coast.

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

*Distribution* : Red sea, Lakshadweep.

#### 129. *Kliopsyllus* sp.

*Material examined* : 1 ex., Kavaratti, 7.3.83; 2 ex., 20.3.83; 1 ex., Agatti, 8.2.87; 1 ex., Bangaram, 10.2.87.

*Description* : Body elongated, dorsoventrally depressed and progressively tapers from anterior to posterior. Rostrum small and pointed anteriorly. Thoracic segments distinct. Anal operculum present. Caudal ramus thrice longer than wide, with 4 terminal setae, the innermost one being well developed. Antennule 7-segmented, with an aesthete on fourth segment. Exopod of antenna 1-segmented, with 3 apical setae. Maxilliped elongated and prehensile. P.1 with both rami 2-segmented, second segment of exopod and endopod bearing 4 and 2 setae, respectively. P.2–P.4 with 1-segmented endopod and

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.

### 130. *Apodopsyllus camptus* Wells

1971. *Apodopsyllus camptus* Wells, *J. nat. Hist.*, 5 : 512.

*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.

## Genus *Paramesochra* Scott, 1892

### 131. *Paramesochra longicaudata* Nicholls

1945. *Paramesochra longicaudata* Nicholls, *J. Roy. Soc. West. Austral.*, 29 : 91.

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

*Diagnostic features* : Body depressed dorsoventrally and tapers evenly from anterior to posterior end. Cephalothorax rounded anteriorly. Rostrum pointed. Anal operculum present. Caudal furca 3.5 times longer than wide with 2 well developed setae. Antennule 7-segmented, with an aesthete on the fourth segment. Exopod of antenna 1-segmented, with 3 setae. Exopod of mandible 1-segmented, with 3 setae. Maxilliped prehensile. Rami of P.1 are 2-segmented. Rami of P.2–P.4 with exopod 3-segmented and endopod 2-segmented. Endopod of P.4 with a modified seta. Inner expansion of P.5 with 2 setae; exopod oval with 3 setae.

*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

1944. *Phyllopodopsyllus aegypticus* Nicholls, *Ann. Mag. nat. Hist.*, 11 : 493.

*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.

Family CYLINDROPSYLLIDAE

Genus *Leptastacus* Scott, 1906

134. *Leptastacus waltirensis* Rao and Ganapati

1969. *Leptastacus waltirensis* Rao and Ganapati, *Proc. Ind. Acad. Sci.*, 69 : 5.

*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.

Genus *Psammastacus* Nicholls, 1935

135. *Psammastacus spinicaudatus* Rao and Ganapati

1969. *Psammastacus spinicaudatus* Rao and Ganapati, *Proc. Ind. Acad. Sci.*, 69 : 7.

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

*Diagnostic features* : Body cylindrical and vermiform 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

1937. *Arenopontia subterranea* Kunz, *Kieler Meeresforsch.*, 2 : 104.

*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

1967. *Arenopontia indica* Rao, *Crustaceana*, 13 : 9.

*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

1945. *Psammopsyllus operculatus* Nicholls, *Jour. Roy. Soc. West Australia*, 29 : 17.

*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. Maxilliped 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

1957. *Sewellina reductus* Krishnaswamy, *Studies on the Copepoda of Madras*, 96.

*Material examined* : 1 ex., Androth, 24.2.83; 1 ex., Kiltan, 2.3.83.

*Diagnostic features* : Body cylindrical, vermiform and highly modified. Much reduced

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 Enhydrosoma Boeck, 1872

#### 140. *Enhydrosoma littorale* Wells

1967. *Enhydrosoma littorale* Wells, *Trans. R. Soc., Edinb.*, 67 : 331.

*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

1840. *Laophonte cornuta* Philippi, *Arch. Naturgesch.*, 5 : 195.

*Material examined* : 2 ex., Androth, 25.2.83; 1 ex., Kavaratti, 6.3.83.

*Diagnostic features* : Body linear with maximum width behind cephalothorax. No distinct demarcation between metasome and urosome. Rostrum depressed and bluntly pointed anteriorly. Thoracic and abdominal segments with ornamentation of hemispherical knobs on posterior margin. Antennule 4-segmented with an aesthete on the third segment. Exopod of antenna 1-segmented with two setae. Maxilliped prehensile with a terminal claw. P.2–P.4 biramous, with 2-segmented endopod and 3-segmented exopod. P.5 biramous with endopod bearing 5 setae and exopod 6 setae.

*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)

1924. *Laophonte quinquespinosa* Sewell, *Mem. Indian Mus.*, 5 : 832.

*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 **Echinolaphonte** Lang, 1965143. **Echinolaophonte tropica** Ummerkutty

1970. *Echinolaophonte tropica* Ummerkutty, *Rec. Zool. Surv. India*, 64 : 159.

*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 **Angeliiera** Chappuis and Delamare, 1954

144. **Angeliiera phreaticola** Chappuis and Delamare

1954. *Angeliiera phreaticola* Chappuis and Delamare, *Arch. Zool. exp. gen.*, 91 : 105.

*Material examined* : 2 ex., Kavaratii, 7.3.83; 1 ex., Minicoy, 15.3.83; 1 ex., Agatti, 7.2.87.

*Diagnostic features* : Body long and vermiform. Thorax 7-segmented and abdomen 2-segmented. Uropod long and biramous, with 6 terminal setae. Eyes absent. Antennule 7-segmented and carries 2 aesthetes. Antenna 5-segmented, with an aesthete on last segment. Epipodite of maxilliped large and bract-like. Pereiopods all alike, 6-segmented and carry a pair of terminal claws. Second pleopod of male 2-jointed and modified for copulation. Viviparous and brood pouch external, carrying a single embryo. Active and thigmotactic, clinging to sand grains. Pairing of adults is common in this species.

*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)

1954. *Robustura predatoris* Gnanamuthu, *Ann. Mag. Nat. Hist.*, 12 : 264.

*Material examined* : 3 ex., Kavaratti, 3.2.87; 1 ex., Agatti, 8.2.87; 2 ex., Androth, 24.2.83.

*Diagnostic features* : Body long, vermiform, colourless and transparent. Eyes absent. Antenna 10-segmented with an aesthete on the fifth and the last segments. Antennule 5-segmented with a terminal aesthete. Mandibular palp reduced to a single spine. Pereiopods all alike and 6-segmented with 2 terminal claws. Second pleopod of male is cylindrical and 2-segmented with a terminal finger-like papilla. Uropod 2-segmented with 6 terminal setae, exopod much reduced. Thigmotactic and clings to sand grains with claws. Sexes separate and reproduction by oviparity. External marsupium absent. Carnivorous and sluggish in habits.

*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

1978. *Microcerberus anfindicus* Meesana, Argano and Baldari *Monitore Zool. Ital.*, 10 : 69.

*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 chitinous 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

1909. *Batillipes mirus* Richters, *Verh. dtsh. Zool. Ges.*, 19 : 85.

**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  $\mu\text{m}$  and width 50  $\mu\text{m}$ .

**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 higginsii** Renaud-Debyser

1965. *Parastygarctus higginsii* Renaud-Debyser, *Bull. Soc. Zool. France*, 90 : 31.

**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  $\mu\text{m}$  and width 60  $\mu\text{m}$ .

*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.

Class ARACHNIDA  
Order ACARINA  
Family HALACARIDAE  
Genus **Halacarus** Gosse, 1855

#### 149. *Halacarus anomalus* Trouessart

1946. *Halacarus anomalus* Trouessart, *Faune de France*, 46 : 152.

*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 upto 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.

Phylum MOLLUSCA  
Class GASTROPODA  
Subclass PROSOBRANCHIA  
Order CAENOGASTROPODA  
Family CAECIDAE  
Genus **Caecum** Fleming, 1913

150. *Caecum glabrum* (Montagu)1803. *Caecum glabrum* Montagu, *Zool. Jb. (Abt. Syst.)*, 71 : 55.*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, 1891151. *Pseudovermis indicus* Salvini-Plawen and Rao1973. *Pseudovermis indicus* Salvini-Palwen and Rao, *Z. Morph. Tiere*, 74 : 237.*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.

Order ACOCHLIDIACEA  
Family MICROHEDYLIDAE  
Genus *Microhedyle* Hertling, 1930

152. *Microhedyle* 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 upto a depth of 30 cm below surface ranged from 340 to 2680 individuals per 10 cm<sup>2</sup> 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,

TABLE 1  
Mean percentage composition of the diverse groups of meiofauna recorded from intertidal sand and algae on Lakshadweep.

Group	Sand	Algae
Hydrozoa	0.2	—
Turbellaria	6.3	4.0
Nematoda	30.4	34.8
Nemertina	0.2	0.4
Gastrotricha	6.0	0.5
Kinorhyncha	0.2	—
Archiannelida	7.4	—
Polychaeta	10.6	8.3
Oligochaeta	1.2	0.2
Ostracoda	2.0	3.6
Copepoda	25.8	22.5
Isopoda	2.2	4.0
Amphipoda	1.0	11.2
Cumacea	0.5	0.3
Insect larvae	1.8	2.4
Halacarida	1.1	2.8
Tardigrada	0.3	—
Mollusca	1.5	3.0
Others	1.3	2.0

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

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 2  
Zoogeographical relationships of the intertidal meiofauna of Lakshadweep

Group	Cosmopolitan Species	Eurytopic Species	Indian Ocean Species	Endemic Species	Total no. of Species
Hydrozoa	—	1	—	—	1
Turbellaria	1	1	1	—	3
Nematoda	11	18	8	1	38
Gastrotricha	2	4	4	6	16
Kinorhyncha	—	—	2	1	3
Archiannelida	2	4	5	1	12
Polychaeta	6	5	6	2	19
Copepoda	13	16	21	1	51
Isopoda	—	1	2	—	3
Tardigrada	1	—	1	—	2
Halacarida	1	—	—	—	1
Mollusca	—	1	2	—	3
Total	37	51	52	12	152

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 endemism 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 cm<sup>2</sup>. 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.

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## ANNELIDA : POLYCHAETA

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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. *Pontogenia 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. *Notophyllum 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 (Nigidion) 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. *Cauleriella capensis* (Monro, 1930)
- \*41. *Cirratulus chrysoderma* Claparede, 1868
- \*\*42. *Cirratulus cirratus* (Müller, 1776)
- \*43. *Cirriiformia filigera* Delle Chiaje, 1825
- \*44. *Cirriiformia punctate* (Grube, 1859)
- \*\*45. *Cirriiformia saxatilis* (Gravier, 1906)
- \*46. *Cirriiformia 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. *Eupolymnia 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. *Branchiomma nigromaculata* (Baird, 1865)  
 \*66. *Hypsicomus phaeotaenia* (Schmarda, 1861)  
 \*67. *Sabellastate 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

1878. *Pontogenia indica* Grube, *Mem. Acad. Imp. Sec. St. Peterb.*, 25 : 19.

*Material* : 2 exs., Androth, 19.12.1979, A. Misra.

*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 ..... **Iphone**
- 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 **Iphone** Kinberg, 1855

2. **Iphone muricata** (Savigny, 1818)

1818. *Polynoe muricata* Savigny, *Systeme annel.* p., 308.

**Material** : 1 ex., Minicoy, 27.12.1979, A. Misra; 1 ex., Minicoy, 10.3.1983, A. Misra; 1 ex., Kavaratti, 29.3.1984, A. Misra; 2 exs., Minicoy, 17.2.1986, R. K. Chakraborty.

**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* - Zangibar; Mozambique; South Africa; Madagascar; Maldives; Sri Lanka; Mergui; Philippines; Japan; Solomon Is.

Genus **Harmothoe** Kinberg, 1855

3. **Harmothoe minuta** (Potts, 1910)

1910. *Polynoe minuta* Potts, *Trans. Linn. Soc. London (Zool.)*, 13 : 337.

**Material** : 1 ex., Minicoy, 12.12.1979, A. Misra; 1 ex., Minicoy, 24.2.1983, A. Misra.

**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

1910. *Lepidasthenia microlepis* Potts, *Trans. Linn. Soc. London (Zool.)*, 13 : 343.

**Material** : 2 exs., Minicoy, 10.3.1983, A. Misra; 1 ex., Minicoy, 21.12.1984, B. P. Haldar.

**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, 18655. **Thormora jukesi** Baird, 1865

1865. *Thormora jukesi* Baird, *Journ. Proc. Linn. Soc. London (Zool.)*, 8 : 199.

*Material* : 3 exs., Androth, 19.12.1979, A. Misra; 1 ex., Agatti, 27.12.1979, A. Misra.

*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. Caracle elongated and trilobed with narrow lateral folds more or less concealed by the median ridge; neurosetae forked..... **Eurythoe**  
Caracle 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, 18186. **Eurythoe complanata** (Pallas, 1766)

1766. *Aphrodita complanata* Pallas, *Miscellanea Zoologica*, p.109.

*Material* : 10 exs., Androth, 19.12.1979, A. Misra; 8 exs., Agatti, 10.3.1983, A. Misra; 6 exs., Kavaratti, 5.2.1986, R. K. Chakraborty.

*Diagnosis* : Body large, 100-200 mm long, Caracle 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, 18557. **Notopygos hispidus** Potts, 1909

1909. *Notopygos hispidus* Potts, *Trans. Linn. Soc. London. Sr. 2*, 12 : 359.

*Material* : 1 ex., Agatti, 27.12.1979, A. Misra.

**Diagnosis** : Body 25 mm long. the crest of the caranle 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 **Pherecardia** Horst, 1886

8. **Pherecardia striata** (Kinberg, 1857)

1857. *Hermodice striata* Kinberg, *Overs. K. Vetensk Akad. Forh.*, 14 : 13.

**Material** : 1 ex., Kavaratti, 3.1.1980, A. Misra; 1 ex., Kavaratti, 8.2.1986, R. K. Chakraborty.

**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 ..... **Genetyllis**

Genus **Anaitides** Czerniavsky, 1882

9. **Anaitides madeirensis** Langerhans, 1880

1880. *Phyllodoce (Anaitides) madeirensis* Langerhans, *Z. Wiss. Zool.*, 33 : 307.

**Material** : 2 exs., Amini, 26.2.1983, A. Misra.

**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, 186510. *Genetyllis gracilis* (Kinberg, 1866)1866. *Phyllodoce gracilis* Kinberg, *Ofvers. K. Vetensk. Akad. Forh.*, 22 : 55.*Material* : 1 ex., Minicoy, 12.12.1979, A. Misra.*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, 184311. *Notophyllum splendens* (Schmarda, 1861)1861. *Macrophyllum splendens* Schmarda, *Neue. Wirbellose Thiere*. II. Leipzig, p. 82.*Material* : 2 exs., Kavaratti, 4.1.1980, A. Misra*Diagnosis* : Body short and thick, 20 mm long. Prostomium rounded with two large eyes. Nuchal organs as 3-4 finger-like lobes on posterior margin of prostomium. Four pairs of short tentacular cirri arise on segment 3. Parapodia biramous.*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, 181812. *Hesione splendida* Savigny, 18181818. *Hesione splendida* Savigny, *Histoire naturelle des animaux sans vertebres*, p. 316.*Material* : 1 ex., Androth, 19.12.1979, A. Misra; 2 exs., Kavaratti, 3.1.1980, A. Misra; 1 ex., Agatti, 4.1.1980, A. Misra.*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, 186613. *Leocrates diplognathus* Monro, 19261926. *Leocrates diplognathus* Monro, *Journ. Linn. Soc. London.*, 36 : 313.*Material* : 2 exs, Kavaratti, 4.1. 1980, A. Misra.

**Diagnosis** : Body 25-26 mm long. Lateral tentacles larger than the palps, postero-medial tentacles short. Prostomium with a postero-medial furrow, curving back to form a pair of nuchal folds. Notosetae with fine serrations and neurosetae with coarse spines. Upper jaw-plate 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

1951. *Pharyngeovalvata natalensis* Day, *Ann. Natal Mus.*, 12 (1) : 26.

**Material** : 7 exs., Bangaram, 25.12.1979, A. Misra.

**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.

**Distribution** : *India* - Lakshadweep. *Elsewhere* - 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.

**Material** : 2 exs., Bangaram, 26.12.1979, A. Misra.

**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 setae 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 transeverse bars or transeverse row of small cones.....  
.....**Perinereis**  
Paragnaths all conical, no transeverse 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, 186616. *Ceratonereis mirabilis* Kinberg, 1866

1866. *Ceratonereis mirabilis* Kinberg, *Ofver. K. Vetensk Akad. Forh.*, 22 : 170.

*Material* : 1 ex., Agatti, 27.12.1979, A. Misra.

*Diagnosis* : Body about 32 mm long. Prostomium deeply cleft. Palps elongate. Eversible pharynx with chitinous paragnaths on maxillary ring, arranged as follows : Gr I = O; 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, 175817. *Nereis (Nereis) trifasciata* Grube, 1878.

1878. *Nereis (Lycoris) trifasciata* Grube, *Mem. Acad. Sci. S. Peterb.*, 25 : 74.

*Material* : 5 exs., Androth, 29.12.1979, A. Misra.

*Diagnosis* : Body 25-30 mm long. Eversible pharynx with paragnaths arranged as : Gr I = O; Gr II & IV = crescentic clusters; Gr III = rectangular cluster; Gr V = O; 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 transeverse 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 transeverse paragnaths on group VI..... *P. cultrifera*

### 18. *Perinereis cultrifera* (Grube, 1840)

1840. *Nereis cultrifera* Grube, *Actinien Echinodermen und Würmen des Adriatischen und Mittelmeeres*, p. 74.

*Material* : 3 exs., Kalpeni, 9.12.1979, A. Misra; 8 exs., Minicoy, 10.12.1979, A. Misra.

*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 transeverse 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 nuntia* (Savigny, 1820)

1820. *Lycoris nuntia* Savigny, *Description de l'Egypte Hist. Nat.*, 21 : 33.

*Material* : 1 ex., Amini, 13.4.1984, A.Misra.

*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.

*Material* : 2 exs., Minicoy, 10.12.1979. A. Misra; 1 ex., Kavaratti, 6.2.1986, R. Chakraborty.

*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 transeverse 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; Proboscoidal papillae conical with 15-20 rings.....  
 ..... *G. lancadivae*  
 Two postsetal lobes; Proboscoidal papillae very long, not ringed.....*G. tesselata*

**21. *Glycera lancadivae* Schmarda, 1861**

1861. *Glycera lancadivae* Schmarda, *Neue Wirbellose Thiere*, p. 95.

**Material** : 2 exs., Bangaram, 26.12.1979, A. Misra; 3 exs, Kiltan, 2.5.1983, A. Misra, 5 exs., Kiltan, 3.3.1984, A. Misra.

**Diagnosis** : Body 80-85 mm long. Pharynx eversible, with conical papillae having 15-20 rings. Parapodia with two subequal presetal and one rounded postsetal lobe having dorsal projection, branchiae absent. Jaw-supports with widely divergent, unequal prongs.

**Distribution** : India - Lakshadweep; Madras. **Elsewhere** - Madagascar; Persian Gulf; Maldives; Sri Lanka; New Caledonia.

**22. *Glycera tesselata* Grube, 1863**

1863. *Glycera tesselata* Grube, *Zahlreiche Gattungen*, 29 : 41.

**Material** : 1 ex., Minicoy, 12.12.1979, A. Misra; 1 ex., Agatti, 27.12.1979, A. Misra; 2 exs., Minicoy, 10.3.1983, A. Misra.

**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. siciliensis*  
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. afra afra*  
Gills begin before 18th setiger and with 3-8 filaments, body with punctate spots...  
.....*E. afra punctata*  
Gills begin after 18th setiger and with 2-4 filaments, body uniformly brown.....  
.....*E. afra paupera*

23. *Eunice antennata* (Savigny, 1820)

1820. *Laodice antennata* Savigny, *Systeme Annelids Description Egypte. Hist. Nat. Paris*, p. 21.

*Material* : 1 ex., Androth, 19.12.1978, A. Misra.

*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)

1865. *Nicidion cincta* Kinberg, *Ofvers. K. Vetensk Akad. Forh.*, 21 : 564.

*Material* : 1 ex., Minicoy, 12.12.1979, A. Misra.

*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**

1878. *Eunice coccinea* Grube, *Mem. Acad. Sci. S. Peterb.*, 25 : 153.

*Material* : 4 exs., Androth, 19.12.1979, A. Misra.

*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.

*Distribution* : *India* - Lakshadweep. *Elsewhere* - Tropical Indo-west Pacific and Gulf of Guinea.

**26. *Eunice marenzelleri* Gravier, 1901**

1901. *Eunice marenzelleri* Gravier, *Nouv. Archs. Mus. Hist. nat.*, 2 (4) : 229.

*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**

1840. *Eunice siciliensis* Grube, *Actinien. Echinidermen und Würmen des Adriatischen und Mittelmeeres*, p. 83.

*Material* : 2 exs., Agatti, 29.12.1979, A. Misra.

*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* - Lakshadweeps; Gujarat; Gulf of Mannar; Andaman. *Elsewhere* - Tropical Indo-west Pacific; Atlantic; Mediterranean.

**28. *Eunice afra afra* Peters, 1854**

1854. *Eunice afra* Peters, *Mber. Akad. Wiss.*, p. 611.

*Material* : 1 ex., Minicoy, 11.xii.1979, A. Misra; 2 exs., Androth, 19.xii.1979, A. Misra; 2 exs., Kavaratti, 7.ii.1986, R. K. Chakraborty.

*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

1878. *Eunice paupera* Grube, *Mem. Acad. Sci. S. Peterb.*, 25 (7): 160.

*Material* : 1 ex., Kavaratti, 3.1.1980, A. Misra; lex., Minicoy, 11.3.1983, A. Misra.

*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

1854. *Eunice punctata* Peters, *Mber. Akad. Wiss.*, p. 611.

*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

1833. *Lysidice ninetta* Audouin & Milne Edwards, *Annals. Sci. Nat.*, 29 : 235.

*Material* : 4 exs., Androth, 19.12.1979, A. Misra; 8 exs., Agatti, 24.12.1979, A. Misra.

*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

1865. *Lysidice natalensis* Kinberg, *Ofvers. K. Vetensk. Akad. Forh.*, 21 : 566

**Material** : 1 ex., Minicoy, 12.12.1979, A. Misra; 2 exs., Minicoy, 13.3.1983, A. Misra; 2 exs., Kiltan, 3.3.1984, A. Misra; 1 ex., Minicoy, 14.2.1986, R. K. Chakraborty.

**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)

1865. *Nauphanta corallina* Kinberg, *Ofvers. K. Vetensk. Akad. Forh.*, 21 : 564.

**Material** : 1 ex., Minicoy, 14.2.1986, R. K. Chakraborty.

**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

1903. *Marphysa macintoshi* Crossland, *Proc. Zool. Soc. Lond.*, p. 137.

**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; Zangibar; Mozambique; South Africa; Madagascar; Australia.

Family ONUPHIDAE

Genus *Onuphis* Audouin & Milne Edwards, 1833

### 35. *Onuphis* (*Nothria*) *conchylega* Sars, 1835

1835. *Onuphis* (*Nothria*) *conchylega* Sars, *Baskrivalser Og Jagttagelser overnogle moerkelige eller nye Havet ved den Bergenoke kyst levende Dyr of ployperness, ... Arter Og deres Forekommen*, 12 : 61.

*Material* : 22 exs., Kavaratti, 12.2.1983, A. Misra.

*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)

1818. *Aglaura fulgida* Savigny, *Histoire naturelle des animaux sans vertebres.*, p. 326.

*Material* : 2 exs., Kavaratti, 4.1.1980, A. Misra.

*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)

1919. *Cenothrix mutans* Chamberlin, *Mem. Mus. Comp. Zool. Harv.*, 48 : 330.

*Material* : 9 exs., Minicoy, 11.3.1983, A. Misra; 2 exs., Minicoy, 16.2.1986, R. K. Chakraborty.

*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* - Zangibar; 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)

1928. *Scolelepis indica* Fauvel, *Bull. Mus. Hist. nat.*, 34 : 4.

*Material* : 1 ex., Agatti, 28.12.1979, A. Misra; 12 exs., Kavaratti, 7.3.1983, A. Misra; 6 exs., Minicoy, 16.2.1986, R. K. Chakraborty.

*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)

1806. *Lumbricus squamatus* Muller, *Zoologica Danica seu. Animalium Daniae et Norwegiae rariorum ac minus notorum, Descriptiones et Histoire*, Havniae, Atlas, p. 39.

*Material* : 12 exs., Minicoy, 15.3.1983, A. Misra.

*Diagnosis* : Body 55-75 mm long. Prostomium pointed anteriorly with six eyes in a row and a well developed occipital ridge extending up to setiger 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.

## 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, 191940. **Caulleriella capensis** (Monro, 1930)

1930. *Heterocirrus caputesocis* var. *capensis* Monro, *Discovery Rep.*, 2 : 156

*Material* : 1 ex., Androth, 23.2.1983, A. Misra.

*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, unidentate acicular hooks in both rami posteriorly.

*Remarks* : This is the first record of the genus from Indian waters.

*Distribution* : India - Lakshadweep. *Elsewhere* - South Africa.

Genus **Cirratulus** Lamarck, 1801

## Key to species

- Acicular hooks absent, only capillary setae present even in posterior setigers.....  
 ..... **C. chrysoderma**
- Both acicular hooks and capillaries present..... **C. cirratus**

41. **Cirratulus chrysoderma** Claparede, 1868

1868. *Cirratulus chrysoderma* Claparede, *Mem. Soc. Phys. Hist. nat. Geneve.*, 19 (2) : 262.

*Material* : 17 exs., Minicoy, 10.3.1983, A. Misra.

*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. **Cirratulus cirratus** (Muller, 1776)

1776. *Lumbricus cirratus* Muller, *Zoologia Danicae Prodromus Seu Animalium Danicae et Norvegiae indigenarum characters, nomine et Synonyma imprimis popularium*, Havniae, p. 215.

*Material* : 2 exs., Amini, 26.2.1983, A. Misra.

**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)

1825. *Lumbricus filigerus* Delle Chiaje, *Memorie Sulla storia e notomia delgi animali senza vertebra del regno di Napoli, Naples, 3* : 178.

**Material** : 1 ex., Kavaratti, 1.1.1980, A. Misra; 2 exs., Androth, 23.2.1983, A. Misra; 1 ex., Agatti, 5.8.1984, A. Misra.

**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.

**Distribution** : *India* - Lakshadweep; Gujarat; Andamans. *Elsewhere* - Mozambique; Persian Gulf; Sri Lanka; Mergui Arcipelago; North Carolina; Gulf of Mexico; Mediterranean Sea.

#### 44. *Cirriformia punctata* (Grube, 1859)

1859. *Cirratulus punctatus* Grube, *Annulata Orstediana*, pt. 3 : 107.

**Material** : 1 ex., Minicoy, 12.12.1979, A. Misra.

**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)**

1906. *Audouinia saxatilis* Gravier, *Nouv. Archs. Mus. Hist. nat. Paris*, 8 : 154.

*Material* : 4 exs., Minicoy, 10.3.1983, A. Misra.

*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.

*Distribution* : India - Lakshadweep. *Elsewhere* - Mozambique; Gulf of Eden.

**46. Cirriformia tentaculata (Montagu, 1808)**

1808. *Terebella tentaculata* Montagu, *Trans. Linn. Soc. London*, 9 : 110.

*Material* : 1 ex., Kavaratti, 19.3.1984, A. Misra.

*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 OPHELIIDAE

Genus *Armandia* Filippi, 1861

*Key to species*

29-30 setigerous segments.....*A. lanceolata*

33-37 setigerous segments.....*A. leptocirrus*

**47. Armandia lanceolata Willey, 1905**

1905. *Armandia lanceolata* Willey, *Suppl. Rep. Ceylon Pearl Oyster Fish*, 4 : 288.

*Material* : 2 exs., Kavaratti, 31.3.1984, A. Misra.

*Diagnosis* : Body 20-22 mm long, Prostomium conical. Branchiae from setiger 2 onwards, absent on last 3-4 setigers. Lateral eye-spots 12 pairs beginning from setiger 7. Anal funnel compressed, fringed with small 10-15 papillae, with a median anal cirrus.

*Distribution* : India - Lakshadweep; Pamban; Andamans. *Elsewhere* - Persian Gulf; Indo-China; Australia; New Caledonia.

**48. Armandia leptocirrus Grube, 1878**

1878. *Armandia leptocirrus* Grube, *Mem. Acad. Sci. S. Peterb.*, 25 : 194.

**Material** : 1 ex., Minicoy, 16.2.1986, R. K. Chakraborty.

**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. *Dasymallus caducus* Grube, *Sabellaria*, 14 : 166.

**Material** : 14 exs., Agatti, 24.12.1979, A. Misra.

**Diagnosis** : Body long, cylindrical, 150-230 mm long. Thoracic setiger 13, biannulate and tessellated. One another asetigerous segment. Thorax with capillary setae only. Abdominal parapodia as low ridges bearing rows of hooks. Branchiae retractile, with numerous simple filaments appearing from abdominal segments 20-25 onwards.

**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

1851. *Notomastus latericeus* Sars, *Nyt. Mag. Naturvid.*, 6 : 199.

**Material** : 2 exs., Kavaratti, 1.1.1980, A. Misra.

**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-ventral 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**

1914. *Axiothella australis* Augener, *Die Fauna, Sudwest Australiens*, Jena, 5 : 65.

*Material* : 45 exs., Minicoy, 11.3.1983, A. Misra.

*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)**

1906. *Axiothea obockensis* Gravier, *Nouv. Archs: Mus. Hist. nat.*, 8 : 206.

*Material* : 57 exs., Minicoy, 11.3.1983, A. Misra.

*Diagnosis* : Body 15-30 mm long. Cephalic plate oval-shaped, slanting with a smooth cephalic rim. Nuchal grooves straight, parallel. Anal funnel with several small cirri and a long ventral cirrus. Long slender, bipinnate setae absent.

*Distribution* : India - Lakshadweep; Gulf of Mannar; Kilakarai. *Elsewhere* - Red Sea.

## 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

1921. *Myriochele picta* Southern, *Mem. Indian Mus.*, 5 : 638.

*Material* : 13 exs., Kavaratti, 27.3.1984, A. Misra.

*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 ceteriore osservati vivinegli anvi.*, p.31.

*Material* : 7 exs., Kavaratti, 19.3.1983, A. Misra.

**Diagnosis** : Body 25-50 mm long. Tube membranous, strengthened by imbricating sand grains. Prostomium with frilly feeding membrane. Thoracic region with three short setigers bearing capillary setae. First five abdominal setigers longer, abdomen with notopodial capillaries and neuropodial rows of minute long-shafted hooks.

**Distribution** : *India* - Lakshadweep ; Tuticorin ; Orissa coast. *Elsewhere* - Cosmopolitan.

Family SABELLARIIDAE

Genus *Lygdamis* Kinberg, 1867

55. *Lygdamis indicus* Kinberg, 1867

1867. *Lygdamis indicus* Kinberg, *Ofvers. K. Vetensk. forh.* 23 : 350.

**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 liner 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 lamelated 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 TERESELLIDAE

*Key to genera*

1. Branchiae present as simple filaments..... **Thelepus**
- Branchiae present as branched filaments..... 2
2. Notosetae with smooth tips..... 3
- Notosetae 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)

1818. *Terebella nebulosa* Montagu, *Trans. Linn. Soc. London*, 12 : 343.

**Material** : 1 ex., Minicoy, 12.12.1979, A. Misra; 1 ex., Agatti, 29.12.1979, A. Misra.

**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. Notoetae 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 **Lanica** Malmgren, 1866

58. **Lanice conchilega** (Pallas, 1766)

1766. *Nereis conchilega* Pallas, *Miscellanea Zoologica*, p. 131.

**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, 186659. *Loimia medusa* (Savigny, 1820)

1820. *Terebella Medusa* Savigny, *Système des annelides, principalement de celles des cotes de Egypte et de la syria.*, p. 95.

*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, 186660. *Nicolea gracilibranchis* (Grube, 1878)

1878. *Terebella gracilibranchis* Grube, *Mem. Acad. Sci. S. Peterb.*, 25 : 230.

*Material* : 3 exs., Agatti, 29.12.1979, A. Misra; 1 ex., Minicoy 12.3.1983, A. Misra.

*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, 186661. *Pista robustiseta* Caullery, 1915

1915. *Pista robustiseta* Caullery, *Bull. Soc. Zoo. Fr.*, 40 : 71.

*Material* : 2 exs., Minicoy, 12.12.1979, A. Misra.

*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, 176762. *Terebella pterochaeta* Schmarda, 1861

1861. *Terebella pterochaeta* Schmarda, *New Wirbellose Thiere beobachtet und gesammelt auf Reise un die Erde.*, p. 43.

*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 Calendonias; Senegal.

### 63. *Terebellodibranchia agattiensis* Misra and Chakraborty

*Terebellodibranchia agattiensis* Misra and Chakraborty, *Rec. Zool. Surv. India* (in Press).

*Material* : Holotype : Agatti, Z.S.I. Reg. No. An 1893/1; 29.12.1979, A. Misra; Paratype : 1 ex., Kavaratti, Z.S.I. Reg. No. An 1894/1, 31.1.1980, A. Misra; 1 ex., Agatti, Z.S.I. Reg. No. An 1895/1, A. Misra.

*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. Notosetae 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)

1859. *Terebelle comatus* Grube, *Vidensh, Meddel. Fr. d naturhist. Foren. Kobenhavn.*, pt. III : 109.

*Material* : 1 ex., Agatti, 29.12.1979, A. Misra.

*Diagnosis* : Body 55 mm long, Tentacular lobe without eye-spots. Branchiferous segments 3, with numerous gill filaments. Notosetae 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, 185865. **Branchiomma nigromaculata** (Baird, 1865)1865. *Sabelle nigromaculata* Baird, *J. Linn. Soc. Zool.*, 8 : 159.**Material** : 3 exs., Agatti, 27.12.1979, A. Misra.**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, 187066. **Hypsicomus phaeotaenia** (Schmarda, 1861)1861. *Sabella phaeotaenia* Schmarda, *New Wirbellose Thiere beobachtet und gesammelt aufeiner Reise um die Erde.*, p. 35.**Material** : 1 ex., Minicoy, 14.12.1979, A. Misra; 3 exs., Agatti, 29.12.1979, A. Misra.**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, 181867. **Sabellastrate sanctiiocephii** (Gravier, 1906)1906. *Eurato sancti-josephi* Gravier, *Bull. Mus. Hist. Nat.*, 12 : 105.**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, 186168. **Pomatostegus stellatus** (Abildgaard, 1789)

1789. *Terebella stellatus* Abildgaard, *Ges. naturf. Freunde Berlin, Schr.*, 9 : 142.

*Material* : 2 exs., Agatti, 17.12.1979, A. Misra; 1 ex., Agatti, 27.12.1979, A. Misra; 3 exs., Agatti, 29.12.1979, A. Misra.

*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, 181869. **Spirobranchus giganteus corniculatus** (Grube, 1862)

1862. *Serpula (Pomatoceros) corniculata* Grube, *Jahresb. Abh. Schles. Ges. Breslau*, 39 : 66.

*Material* : 1 ex., Kavaratti, 5.1.1980, A. Misra; 3 exs., Agatti, 4.4.1984, A. Misra.

*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.

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## SIPUNCULA

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### 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 *Lithacrosiphon cristatus* is also being described. Two species, *Physcosoma ruppellii* 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). *Xenosiphon (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

*Sipunculus indicus* (S)  
*Xenosiphon (Xenopsis) indicus* (J)  
*Sipunculus cumanensis* (S)  
*S. billitonensis* (S)  
*S. vastus* (S)  
*Golfingia pyriformis* (H)  
*Phascolosoma dissors* (S)  
*Physcosoma agassizii* (S)

#### REVISED LIST OF SPECIES

*Sipunculus indicus*  
*Sipunculus indicus*  
*Siphonosoma cumanense*  
*Siphonosoma cumanense*  
*S. vastum*  
*Themiste lageniformis*  
*Themiste lageniformis*  
*Phascolosoma agassizii*  
*P. albolineatum*

_____	<i>P. japonicum</i>
_____	<i>P. nigrescens</i>
<i>Physcosoma pacificum</i> (S)	<i>P. pacificum</i>
<i>Physcosoma dentigerum</i> (S)	<i>P. perlucens</i>
<i>P. scolops</i> (S)	<i>P. scolops</i>
_____	<i>P. stephensoni</i>
<i>Physcosoma ruppellii</i> (S)	?
<i>P. asser</i> (S)	<i>Antillesoma antillarum</i>
<i>P. pelma</i> (S)	<i>Antillesoma antillarum</i>
_____	<i>Apionsoma</i> sp. (cf. <i>misakiana</i> )
<i>Aspidosiphon steenstrupii</i> (S)	<i>Aspidosiphon steenstrupii</i>
<i>Cloeosiphon aspergillum</i> (S)	<i>Cloeosiphon aspergillum</i>
_____	<i>Lithacrosiphon cristatus</i>
	<i>lakshadweepensis</i> subsp. nov.

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S = Shipley (1903), J = Johnson (1969), H = Haldar (1975)

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#### 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 .....*lageniformis* 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

- 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 lakshadweepensis* 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.....  
.....*pacificum* Keferstein
- 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 posteriorly 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

1850. *Sipunculus indicus* Peters, *Arch. anat. physiol.*, 1850 : 382-383.  
 1903. *Sipunculus indicus* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 136.  
 1985. *Sipunculus indicus* : Cutler and Cutler, *Zool. J. Linn. Soc.*, 85 : 241-242.

*Material examined* : 7 exs., Minicoy, 18.xii.1979; 5 exs., Bangaram, 7.iv.1984; 10 exs., Minicoy, 18.ii.1986.

*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 tuberosus 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* Spengel2. *Siphonosoma cumanense* (Keferstein)

1867. *Phascalosoma cumanense* Keferstein, *Z. wiss. Zool.*, 17 pl.6, figs. 19-21.  
 1903. *Sipunculus billitonensis* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 135.  
 1903. *Sipunculus cumanensis* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 135-136  
 1984. *Siphonosoma cumanense* : Cutler, Cutler and Nishikawa, *publs Seto mar. biol. Lab.*, 29 (4/6): 258-260, pl. 1, fig. 1.

*Material examined* : 7 exs., Minicoy, 12.xii. 1979; 12 exs., Kavaratti, 30.iii.1984.

*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 posteriorly. 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.  
 1903. *Sipunculus vastus* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 136.  
 1984. *Siphonosoma vastum* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6) : 261, fig. 2 C.

*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.

Order GOLFINGIIFORMES

Family THEMISTIDAE

Genus Themiste Gray

### 4. *Themiste lageniformis* Baird

1868. *Themiste lageniformis* Baird, *Proc. zool. Soc. Lond.*, 1868 : 98-99.  
 1975. *Golfingia pyriformis* : Haldar, *Proc. internat. Symp. Biol. Sipuncula & Echiura*, 1 : 61 (non-*Phascolosoma pyriformis* Lanchester, 1905)  
 1984. *Themiste lageniformis* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 2 (4/6) : 283-284.

*Material examined* : 12 exs., Minicoy, 14.xii.1979; 5 exs., Androth, 20.xii.1979; 4 exs., Agatti, 4.iv.1984; 6 exs., Kavaratti, 6.ii.1986.

*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

1866. *Phascolosoma agassizii* Keferstein, *Nachr. Ges. wiss. Gottingen*, 1866 : 218.  
 1903. *Physcosoma agassizii* Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 133.  
 1979. *Phascolosoma (Phascolosoma) agassizii* Cutler and Cutler, *Bull. Mus. natn. Hist. nat. Paris.* (4) 1 (A/4) : 982-983.

*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 albolineatum* Baird

1868. *Phascolosoma albolineatum* Baird, *Proc. zool. Soc. Lond.*, 1868 : 91-92.  
 1984. *Phascolosoma albolineatum* : Cutler, Cutler and Nishikawa, 1984. *Publs Seto mar. biol. Lab.*, 29 (4/6) : 292-293, fig. 10 C.

*Material examined* : 30 exs., Bangaram, 7.iv.1984; 15 exs., Agatti, 8.iv.1984; 9 exs., Minicoy, 12.ii.1986.

*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

1877. *Phascolosoma japonicum* Grube, Vierundfunfzigster Jahresbericht der Schles. Gesellschaft für vaterländischer Cultur, Breslau : 73.

1984. *Phascolosoma japonicum* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6) : 293-296, figs. 10 F, 11.

*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

1865. *Phascolosoma nigrescens* Keferstein, *Z. wiss. Zool.*, 15 : 424, pl.13, fig.2; pl.32, figs. 14-15.

1984. *Phascolosoma nigrescens* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6) : 296, fig. 10 E.

*Material examined* : 11 exs., Androth, 19.xii.1979; 15 exs., Agatti, 5.iv.1984; 6 exs., Minicoy, 18.ii.1986.

*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

1866. *Phascolosoma pacificum* Keferstein, *Nachr. Ges. wiss. Gottingen*, 1866 : 8-9.

1903. *Physcosoma Pacificum* Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 134.

1984. *Phascolosoma pacificum* Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6): 296-297, figs. 10 B, G, 11.

*Material examined* : 8 exs., Minicoy, 12.xii.1979; 7 exs., Agatti, 4.iv.1984; 6 exs., Kavaratti, 12.ii.1986; 5 exs., Minicoy, 18.ii.1986.

*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

1868. *Phascolosoma perlucens* Baird, *Proc. zool. Soc. Lond.*, 1868 : 90-91, pl. 10, fig. 2.

1903. *Physcosoma dentigerum* Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 134.

1984. *Phascolosoma perlucens* Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6) : 297, fig. 10 H.

*Material examined* : 2 exs., Minicoy, 14.xii.1979; 18 exs., Bangaram, 26.xii.1979; 10 exs., Kavaratti, 27.iii.1984; 16 exs., Amini, 13.iv.1984; 12 exs., Kavaratti, 6.ii.1986; 8 exs., Minicoy, 18.ii.1986.

*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.  
 1903. *Physcosoma scolops* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 135.  
 1984. *Phascolosoma scolops* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6) : 298-299.

*Material examined* : 2 exs., Agatti, 24.xii.1979.

*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)

1942. *Physcosoma stephensoni* Stephen, *Anal. Natal Mus.*, 10 : 250, pl. 11, figs. 3-5.  
 1980. *Phascolosoma (Phascolosoma) stephensoni* Edmonds, *Rec. S. Aust. Mus.*, 18 (1) : 67-68, figs. 127-129.

*Material examined* : 1 ex., Kadmat, 11.iv.1984.

*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)

1858. *Phascolosoma antillarum* Grube and Oersted, *Vidensk. Meddr dansk Naturh. Foren*, 1858 : 1117-1118.

1903. *Physcosoma asser* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 133.  
 1903. *Physcosoma pelma* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 134.  
 1987. *Antillesoma antillarum* : Gibbs and Cutler, *Bull. Br. Mus. nat. Hist. (Zool.)*, 52 (1) : 55.

*Material examined* : 9 exs., Agatti, 24.xii.1979.

*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)]

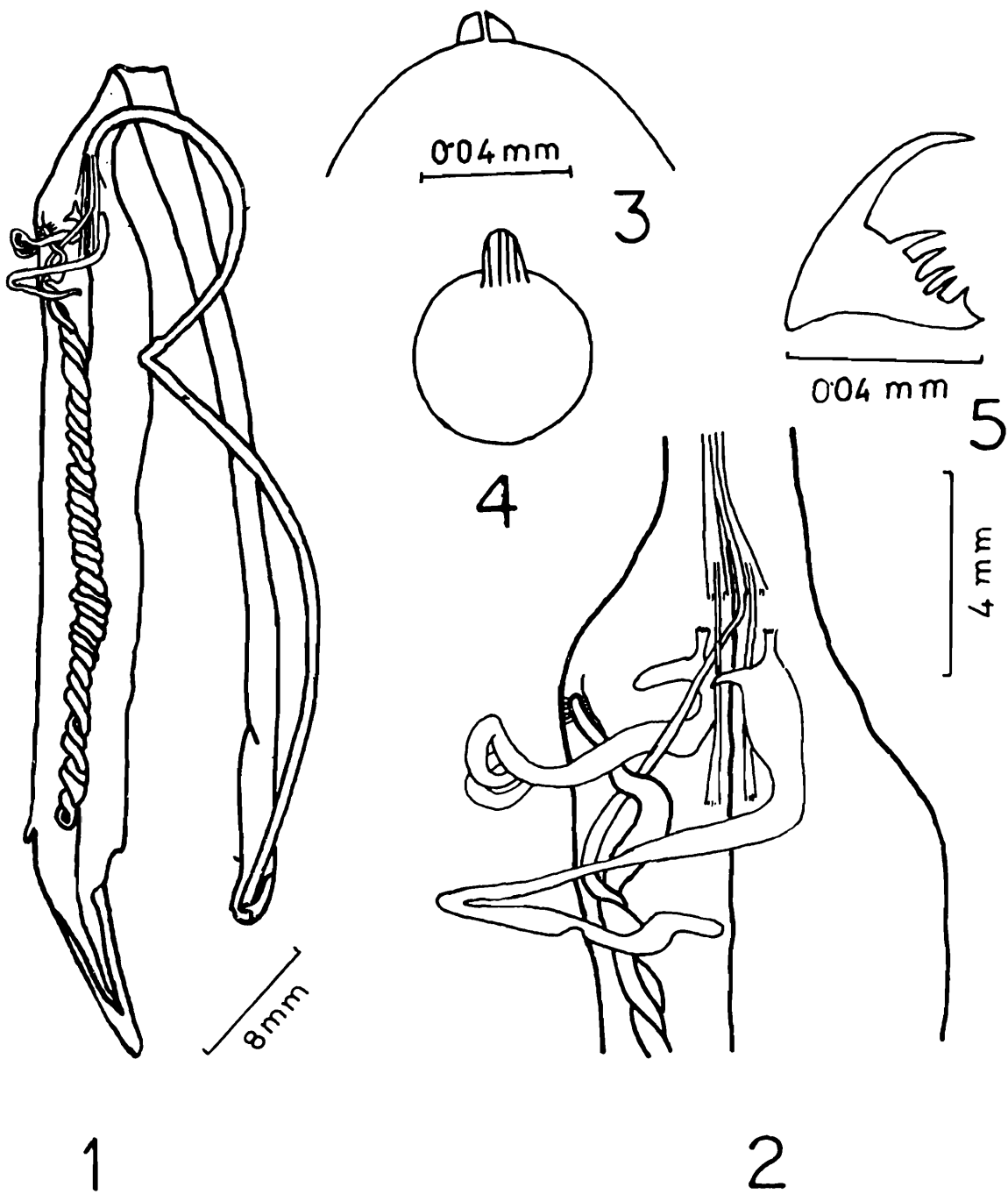
(Figs. 1-5)

1904. *Phascolosoma misakiana* Ikeda, *J. Coll. Sci. imp. Univ. Tokyo*, 20 (4) : 7-9, figs. 3, 30-33.  
 1984. *Apionsoma misakiana* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6) : 300-301, figs. 10 J, 12 B.

*Material examined* : 1 ex., Agatti, "from lagoon", dredged, 4 m, coralline bed, 24.xii.1979.

*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**

1859. *Aspidosiphon steenstrupii* Diesing, *Sber. Akad. Wien*, 37 : 767, pl. 2. figs. 1-6.

1903. *Aspidosiphon steenstrupii* : Shipley, *Fauna & Geog. Mald. Laccad.*, 1 : 131-132.

1984. *Aspidosiphon (Paraspidosiphon) steenstrupii* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29. (4/6) : 308-309, figs. 13B, G.

**Material examined** : 8 exs., Minicoy, 12.xii.1979; 15 exs., Bangaram, 25.xii.1979; 10 exs., Agatti, 3.iv.1984; 11 exs., Kavaratti, 7.ii.1986; 5 exs., Viringilli near Minicoy, 17.ii.1986.

**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 level of trunk. These variations are, however, not taxonomically significant.

**Distribution** : This is a circumtropical 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)

1865. *Loxosiphon aspergillus* Quatrefages, Histoire naturelle des Anneles marins et d'eau douce. Paris, 2 : 605, pl. 20, fig. 20.

1903. *Cloeosiphon aspergillum* : Shipley, Fauna & Geog. Mald. Laccad., 1 : 132.

1984. *Cloeosiphon aspergillus* : Cutler, Cutler and Nishikawa, *Publs Seto mar. biol. Lab.*, 29 (4/6) : 310-311, pl.2, fig.5, text-fig. 14 A.

**Material examined** : 12 exs., Kalpeni, 9.xii.1979; 3 exs., Minicoy, 13.xii.1979; 5 exs., Kavaratti, 5.i.1980; 10 exs., Amini, 13.iv.1984; 5 exs., Kavaratti, 6.ii.1986; 6 exs., Minicoy, 14.ii.1986.

**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 quadrate 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.

Genus *Lithacrosiphon* Shipley17. *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.

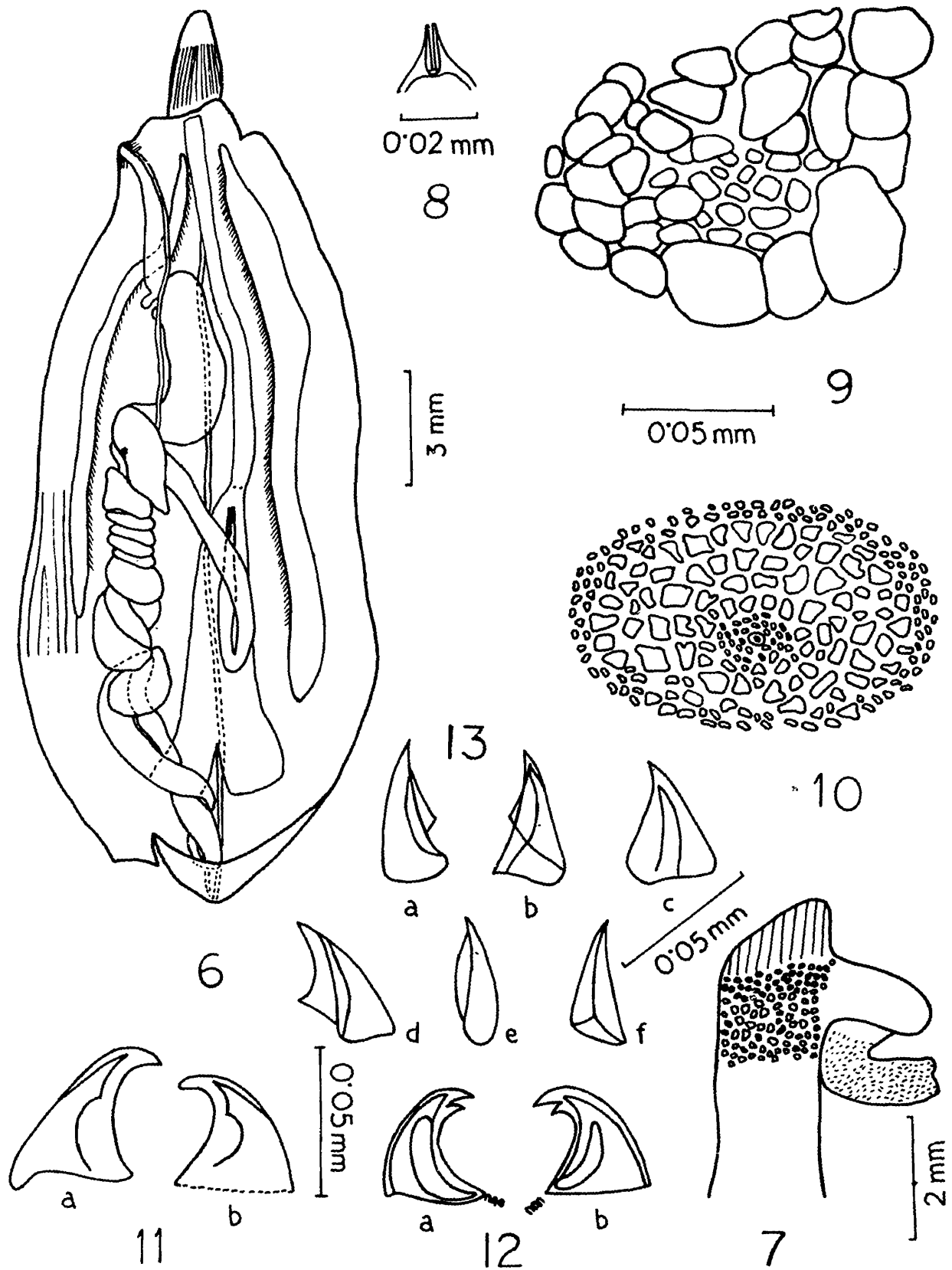
*Remarks* : The new subspecies is closely allied to *L.cristatus cristatus* (Sluiter) but readily differs from it by the number of longitudinal furrows on anal shield (20-25 vs. 30-50), number of longitudinal muscle bands (8-15 vs 13-24), origin of retractor muscles from posterior seventh of trunk vs. 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, *Lithacrosiphon 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 itrovert; 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 lakshadweepensis*, 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 agassizii*, or long, narrow and posteriorly pointed, as in *Phascolosoma albolineatum* 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. stephensoni*, 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 albolineatum*, *P. perlucens*, *Aspidosiphon steenstrupii* and *Cloeosiphon aspergillus* are abundant, while *Phascolosoma agassizii*, *P. japonicum*, *P. stephensoni*, *Siphonosoma vastum* and *Apionsoma* sp. are scarce in distribution.

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## 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.

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## ECHIURA

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### INTRODUCTION

In Shipley's account (1902) on the echiuran animals of Maldivian 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 Meneville, 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

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\* 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 **THALASSEMATINAE**  
 Longitudinal muscles of the body wall gather at intervals forming distinct longitudinal muscle bands ..... 4 **OCHETOSTOMATINAE**
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, *Miscellanea Zoologica*, 146-151.

1972. *Echiurus echiurus echiurus* : Stephen & Edmonds, *The phyla Sipuncula & Echiura* (British Museum : Nat. Hist.), 412.

*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)

1889. *Thalassema diaphanes* Sluiter, *Natuurk. Tijdschr. Ned. India*, 244 : 248.

1972. *Thalassema diaphanes* : Stephen & Edmonds, *The phyla Sipuncula & Echiura* (British Museum : Nat. Hist.), 455.

**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; Maldive and Lakshadweep islands; Bay of Batavia (Indonesia).

### 3. *Anelassorhynchus inanensis* (Ikeda, 1904)

(Fig. 1, B, C)

1904. *Thalassema inanensis* Ikeda, *J. Coll. Sci. imp. Univ. Tokyo*, 1 87.

1972. *Anelassorhynchus inanensis* : Stephen & Edmonds, *The phyla Sipuncula & Echiura* (British Museum : Nat. Hist.), 448.

*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)

1924. *Thalassema palense* Ikeda, *Jap. J. Zool.*, 39 41.

1972. *Ochetostoma palense* : Stephen & Edmonds, *The phyla Sipuncula & Echiura* (British Museum: Nat. Hist.), 440.

*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 caecum 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*, *stuhmanni* and *palense*. In *O. erythrogrammon* a rectal caecum is present, filamentous gonostomal lips are spirally coiled. In *O. stuhmanni* 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).

### 5. *Ochetostoma capense* Jones & Stephen, 1955

(Fig. 2, C, D, E)

1955. *Ochetostoma capensis* Jones & Stephen, *Trans. R. Soc. S. Afr.*, 273 278.

1972. *Ochetostoma capense* : Stephen & Edmonds, *The phyla Sipuncula & Echiura* (British Museum : Nat. Hist.), 430-431.

*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)

1892. *Thalassema stuhlmanni* Fischer, *Jb. hamb. wiss. Anst.*, 79 89.

1972. *Ochetostoma stuhlmanni* : Stephen & Edmonds, *The phyla Sipuncula & Echiura* (British Museum : Nat. Hist.), 442-443.

*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 *palense* 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 (presetal) and 6 pairs postsetal; 12 longitudinal muscle bands (lmb).....
  - ..... *zanzibarensis* Stephen & Robertson, 1952
  - All 7 pairs of gonoducts postsetal; 7 lmb ..... *senegalensis* Stephen, 1960
3. Gonoducts 5 pairs .....4
  - Gonoducts 4 pairs or less.....5

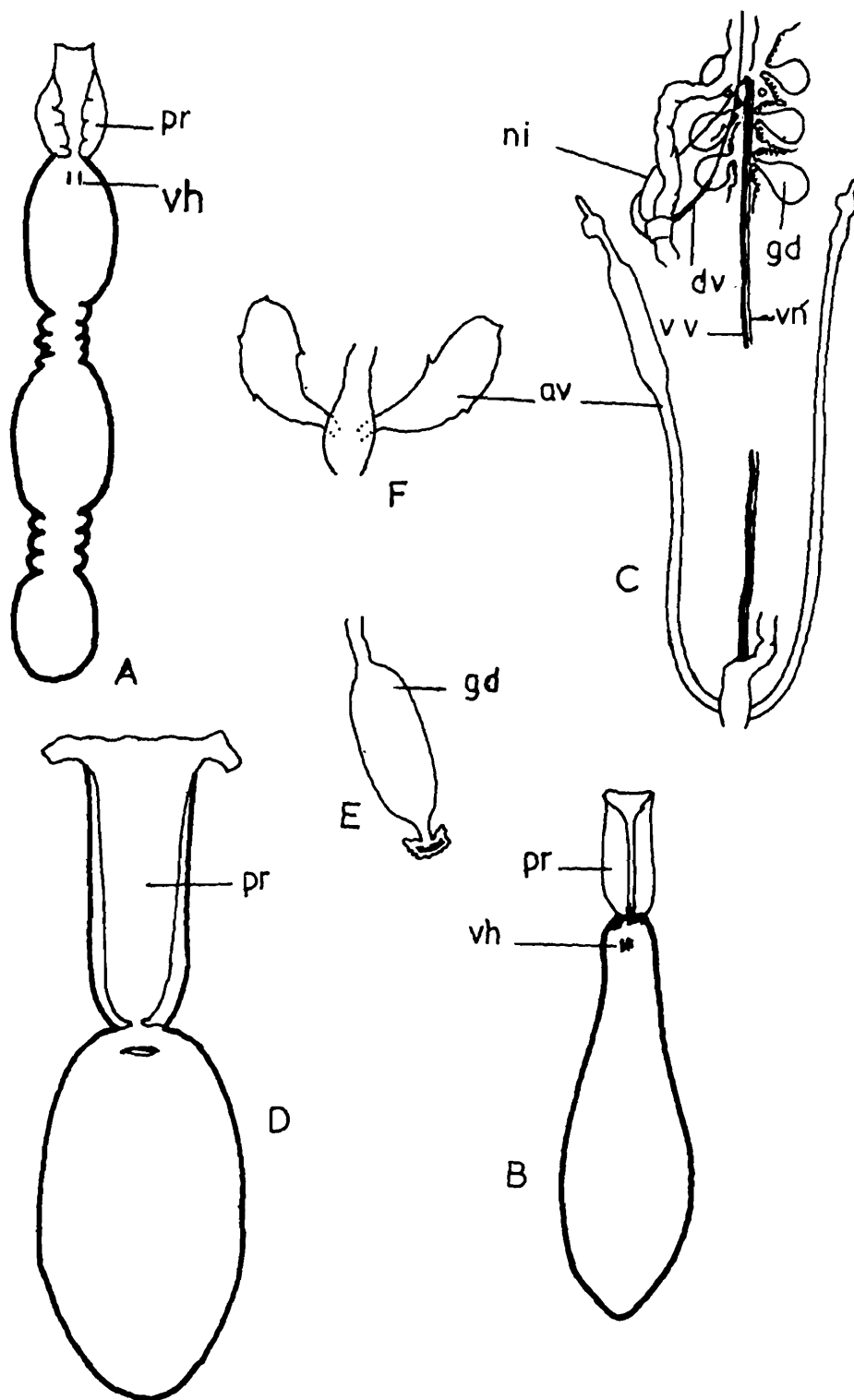


Fig. 1. - A, *Thalassema diaphanes*, ventral view of female x 1<sup>1</sup>/<sub>2</sub>, B-C : *Anelassorhynchus inanensis*; B, ventral view of female x 1, C, internal morphology; D - F, *Eubonellia valida* : D, ventral view of female x 1<sup>1</sup>/<sub>2</sub>, E, gonoduct, F, anal vesicles.

4. 3 pairs of gonoducts presetal and 2 pairs postsetal; 19 lmb.. *hornelli* (Prashad, 1920)  
 1 pair of gonoducts presetal and 4 pairs postsetal, 5th pair of gonoducts may be vestigial; 10 - 11 lmb .....*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
21. With oesophageal diverticulum; 12-13 lmb.....  
 ..... *glaucum* (Wesenburg-Lund, 1957); *atlantidae* Wesenburg-Lund, 1959  
 Without oesophageal diverticulum; trunk in the form of a narrow stem posteriorly;  
 13 lmb ..... *mercator* 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)

1946. *Eubonellia valida* Fisher, *Proc. U. S. natn. Mus.*, 255 257.

1972. *Eubonellia valida* : Stephen & Edmonds, *The phyla Sipuncula & Echiura* (British Museum : Nat. hist.), 383 385.

*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* (Bonellidae) occurring both in Pirotan island (Gulf of Kutch) and Port Blair (Andaman island). The 5 remaining species reported from the Andaman group of islands

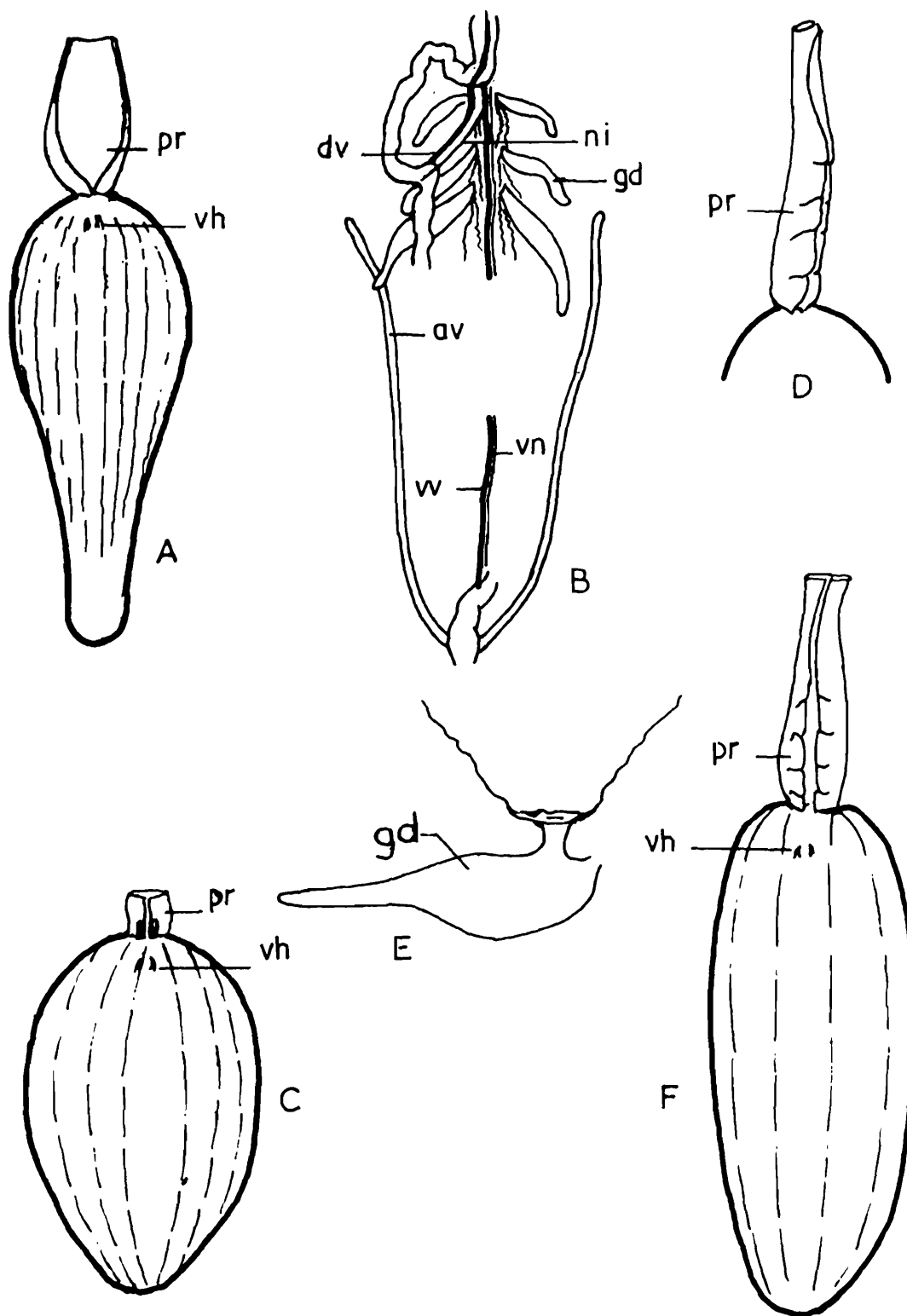


Fig. 2. - A - B, *Ochetostoma palense* : A, ventral view of female x 1<sup>1</sup>/<sub>2</sub>, B, internal morphology, C - E, *Ochetostoma capense* : C, ventral view of female x 1<sup>1</sup>/<sub>2</sub>, D, proboscis, lateral view, E, gonoduct, F, *Ochetostoma stuhlmanni*, ventral view of female 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 Maldives 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 Okhotsk (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.

#### ACKNOWLEDGEMENTS

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## CRUSTACEA : STOMATOPODA

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### 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

Order	STOMATOPODA
Superfamily	GONODACTYLOIDEA Giesbrecht, 1910
Family	GONODACTYLIDAE Giesbrecht, 1910
Genus	<i>Gonodactylus</i> Berthold, 1827

(Affinis Group)

1. *Gonodactylus affinis* de Man, 1902
2. *Gonodactylus minikoiensis*, new species
3. *Gonodactylus viridis* Serene, 1954

(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)
9. *Gonodactylus insularis* Manning and Reaka, 1982
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. falcatus*.
- ix. Dorsal carinae of telson slender; intermediate teeth of telson pointed.....  
..... *G. insularis*.
- Dorsal carinae of telson inflated; intermediate teeth of telson blunt *G. mutatus*.

## SYSTEMATIC ACCOUNT

## Family GONODACTYLIDAE

1. *Gonodactylus affinis* De Man

1902. *Gonodactylus chiragra* var. *affinis* de Man, *Abhandle. Senck. Gos. Frankfurt*, 25 : 912.  
 1903. *Gonodactylus chiragra* var. *segregatus* : Lanchester, *Faun. Geog. Mald. Laccad. Archip.*, 1 : 448. pl. 23, fig. 6.  
 1978. *Gonodactylus affinis* : Manning, *Smithson. contr. Zool.*, (264) : 2, fig. 1.

*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 urepodal 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.

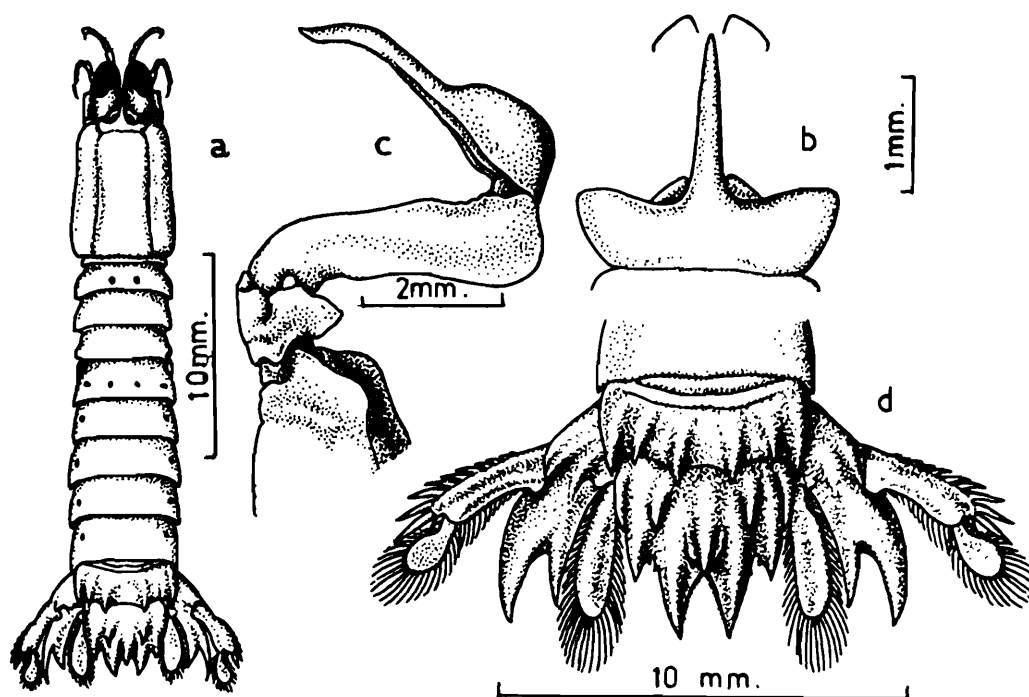


Fig. 1. *Gonodactylus minikoiensis* n. sp., Holotype, female; TL 30 mm. (a) Full specimen; (b) Rostral plate and ocular scales; (c) Raptorial claw; (d) 6th abdominal somite, telson and uropods.

*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 Nhatrang*, 8 : 6, 7, 10, 74, 75, 76, fig. 13-3.

1978. *Gonodactylus viridis* : Manning, *Smithson. contr. Zool.* (264) : 4.

**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, submedians with movable apices, two sharp intermediate denticles and many submedians 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 (Sene, 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

1969. *Gonodactylus chiragra* : Shanbhogue, *Bull. cent. mar. Fish. Inst.*, (9) : 35 (listed).

**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 semite broad, each ending in a posterior spine. Telson broader than long, mid-dorsal carinae broad, anchor present. Marginal teeth on telson 3 pairs: submedians 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)

1895. *Gonodactylus platysoma* Wood-Mason, *Figs and Descr. of nine spp of Squillidae*. Calcutta. p.11, pl.3 figs 3-9.

1903. *Gonodactylus chiragra* var. *acutus* Lanchester, *Fauna, Geog. Mald. Laccad. Archip.*, 1 : 447, pl. 23, fig. 2,3,3a.

1966. *Gonodactylus platysoma* : Manning, *Rec. Aust. Mus.*, 27 : 110.

**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 submedians 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.)

1893. *Gonodactylus smithii* Pocock, *Ann. mag. nat. Hist.*, (6), 11 : 475, pl. 208, fig. 1.

1903. *Gonodactylus chiragra* var. *smithii* : Lanchester, *Faun. Geog. Mald. Laccad. Archlp.*, 1 : 447, pl. 23.

1977. *Gonodactylus smithii* : Dingle, Caldwell and Manning, *Phuket Mar. Biol. Cent. Res. Bull.*, (20) : 19, Fig. 1.

*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 submedians and a pair of accessory medians forming an anchor. Marginal teeth on telson 3 pairs; submedians with movable apices, intermediates sharp, laterals poorly formed. Submedian denticles on telson numerous and two sharp intermediate denticles.

*Remarks* : Body colour faded. The characteristic crimson 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

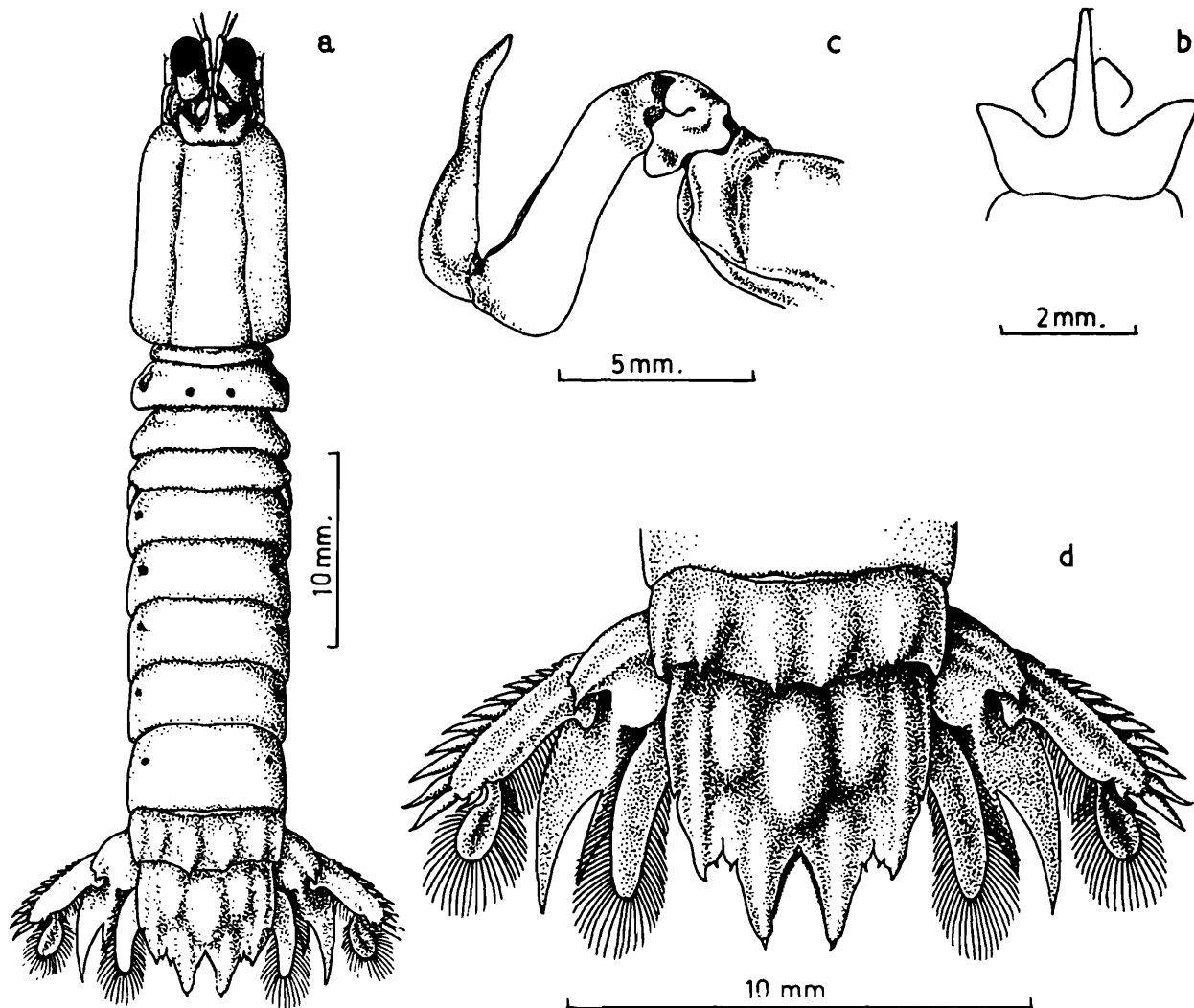
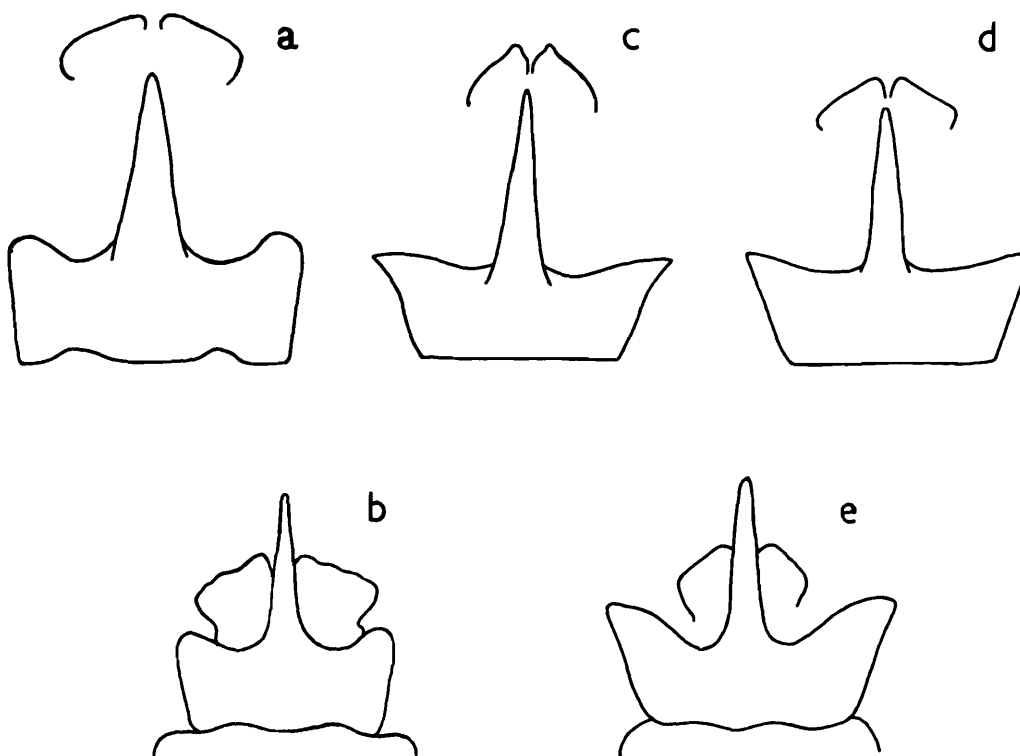


Fig. 2. *Gonodactylus arabica* n. sp., Holotype, female; TL 44 mm. (a) Full specimen; (b) Rostral plate and ocular scales; (c) Raptorial claw; (d) 6th abdominal somite, telson and uropods.

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 of 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. plarysoma*, Male, TL 67 mm; (c) *G. acutirostris*; (d) *G. smithii*; (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)

1775. *Cancer falcatus* Forskall, *Descr. Anim.No.* 60 : 96.

1903. *Gonodactylus chiragra* var. *glabrous* Lanchester, *Faun. Geog. Mald. Laccad. Archip.*, 1 : 48, pl. 23. figs. 8, 9, 15.

1969. *Gonodactylus falcatus* : Shanbhogue, *Bull. cent. mar. Fish. Res. Inst.*, (9) : 35.

**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

1982. *Gonodactylus insularis* Manning and Reaka, *Proc. Biol. Soc. Wash.*, 95 (2) : 347, figs. 1:2.

**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 semite 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

1903. *Gonodactylus chiragra* var. *mutatus* Lanchester, *Faun. Geog. Mald. Laccad. Archip.*, 1 : 450

1978. *Gonodactylus mutatus* : Manning, *Smithson. Contr. Zool.*, (258) : 7, Figs. 4,5 and 11.

**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)

1787. *Squilla ciliata* Fabricius, *Mantiss. Insect.*, 1 : 333.

1903. *Pseudosquilla ciliata* : Lanchester, *Faun. Geog. Mald. Laccad. Archip.*, 1 : 457.

1969. *Pseudosquilla ciliata* : Shanbhogue, *Bull. Cent. mar. Fish. Res. Inst.* (9) : 36.

*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 Indio-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.

1970. *Alima hyalina* : Manning, *Bull. Mus. Nat. Hist. Natur (Paris) Ser. 2*, 41 (6):1432, fig. 1.

1971. *Alima hyalina* : Shanbhogue, *J. mar. biol. Ass. India*, 12 : 198.

*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)

1971a. *Heterosquilla jonesi* Shanbhogue, *J. mar. biol. Ass. India*, 12 : 100, pl. 1.

*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

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. minikoiensis* 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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## INSECTA : ORTHOPTERA

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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	ORTHOPTERA
Suborder	CAELIFERA
Superfamily	ACRIDOIDEA
Family	ACRIDIDAE
Subfamily	CATANTOPINAE

#### 1. *Catantops pinguis innotabilis* (Walker)

(Fig. 1,2,3,4)

1870. *Acridium innotabile* Walker, *Cat. Derm. Salt. B. M.*, 4 : 629.

1953. *Catantops pinguis innotabilis* : Dirsh & Uvarov, *Tijdschr. Ent.*, 96, 3 : 233.

*Materials examined* : 1 Female Kalpitti, 50 meters S. of Agatti, 6.ix.84, Coll. D. K. Mandal (left femur damaged); 1 Female Amini island, 13.iv.84, Coll. D.K. Mandal and party; 1 Female Bangaram, 15 Kms. north of Agatti, 7.iv.84, Coll. D. K. Mandal and party.

*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 Lakshadweep. It is also known from Srilanka and Burma.

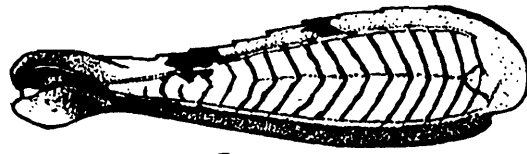


Fig. 1

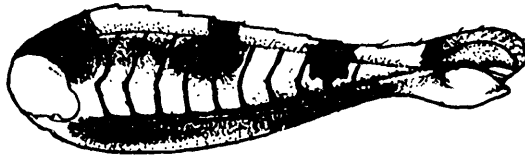


Fig. 2

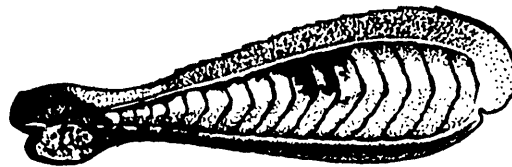


Fig. 3

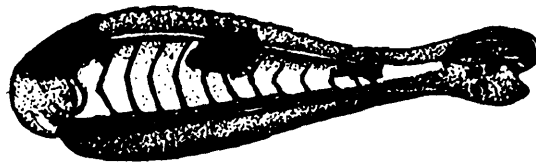


Fig. 4

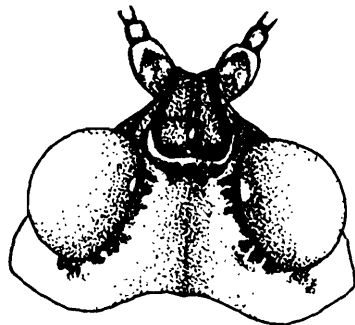


Fig. 5

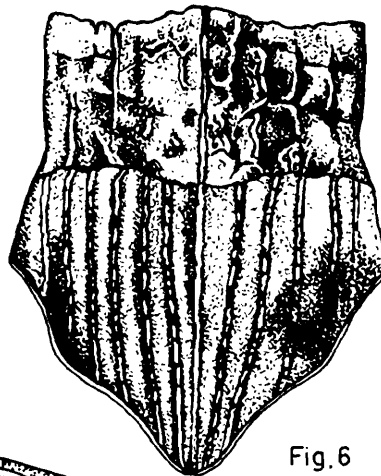


Fig. 6

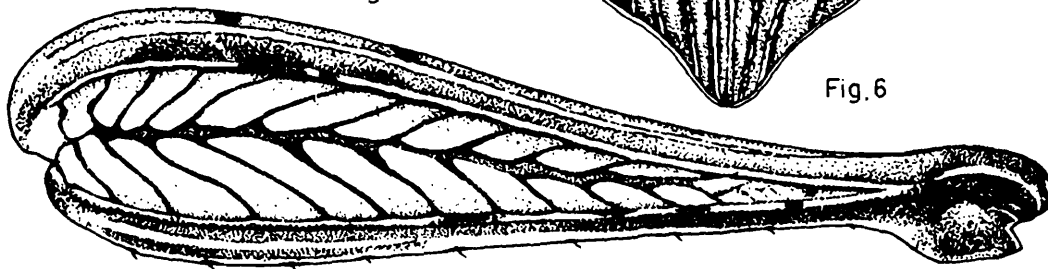


Fig. 7

- 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 ACRIDINAE

2. *Morphacris fasciata sulcata* (Thunberg, 1815)

(Fig. 5, 6, 7)

1910. *Morphacris citrina* Kirby, *Syst. Cat. Orth.*, 3 : 219, no. 4; Kirby 1914 *Faun. Brit. India, Orth.*, (1) : 137.

*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)

1884. *Acrotylus humbertianus* saussure, *Mem. Soc. Geneve*, 28 : 189.

1914. Kirby. *Faun. Brit. India* (Orth.) : 153.

1969. Tandon and Shishodia. *Orient. Insects*, 3 (3) : 367.

*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 narrow 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 Afganistan.

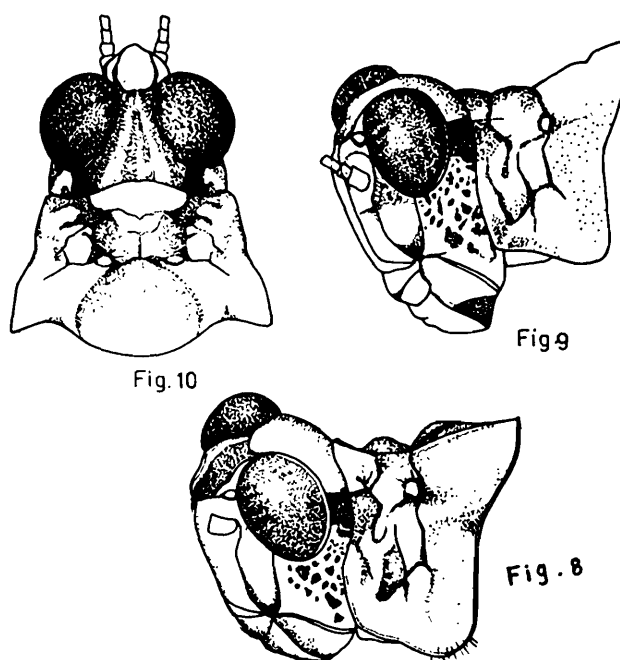


Fig. 8. *Acrotylus humbertianus*; Head region. Fig. 9. *Acrotylus humertianus*; Head and pronotal band structures. Fig. 10. *Acrotylus humbertianus*; Entire fastigium, band and pronotal carinae.

### 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.

### ACKNOWLEDGEMENTS

The authors express their grateful thanks to Dr. B. S. Lamba, Jt. Director-in-charge, Zoological Survey of India, Calcutta for providing laboratory facilities. Thanks are also due to Mr. D. K. Mandal Scientist - 'B' for collecting this interesting material.

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## INSECTA : LEPIDOPTERA

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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.]

Order	LEPIDOPTERA
Suborder I.	RHOPALOCERA
Family A.	PAPILIONIDAE
Subfamily	PAPILIONINAE
Tribe	Papilionini
Genus (1)	<b>Papilio</b> Linn.

1. **polytes romulus** Cr.

Family B. PIERIDAE  
 Subfamily COLIADINAE  
 Genus (2) **Eurema** Hübn.

2. **hecabe contubernalis** (M.)

Family C. DANAIDAE  
 Subfamily DANAINAE  
 Genus (3) **Danaus** Kl.

3. **limniace leopardus** (Butl.)4. **aglea aglea** (St.)

Genus (4). **Euploea** Fabr.

5. **core core** (Cr.)

Family D. SATYRIDAE  
 \*Genus (5) **Mycalesis** Hübn.

6. **mineus polydecta** (Cr.)

Genus (6) **Melanitis** Fabr.

7. **leda ismene** (Cr.)

Family E. ACRAEIDAE  
 Genus (7) **Acraea** Fabr.

8. **violae** (Fabr.)

Family F. NYMPHALIDAE  
 Genus (8) **Vanessa** Fabr.

9. **cardui** (Linn.)

\*Family G. LYCAENIDAE  
 Subfamily LYCAENINAE  
 Genus (9) **Spalgis** M.

10. **epeus epeus** (Westw.)

Genus (10) **Zizula** Chap.

11. *hylax* (Fabr.)

*Family H.	HESPERIIDAE
Subfamily	HESPERIINAE
Genus (11)	<b>Borbo</b> Ev.

12. *cinnara* (Wall.)

Suborder II.	HETEROCERA
*Family I.	SPHINGIDAE
Group	SEMANOPHORAE
Subfamily (A)	SESIINAE
Tribe	Sesiini
Genus (12)	<b>Cêphonodes</b> Hübn.

13. *hylas hylas* (Linn.)

Subfamily (B)	PHILAMPELINAE
Tribe	Nephelini
Genus (13)	<b>Macroglossum</b> Scop.

14. *sitiene* (Walk.)

Subfamily (C)	CHOEROCAMPINAE
Genus (14)	<b>Hippotion</b> Hübn.

15. *rafflesi* (Butl.)

*Family J.	THYRIDIDAE
Genus (15)	<b>Striglina</b> Guen.

16. *scitaria* (Walk.)

*Family K.	LYMANTRIIDAE
Subfamily	LYMANTRIINAE
Group	INAREOLATAE
Genus (16)	<b>Euproctis</b> Hübn.

17. *varians* (Walk.)

Family L.	ARCTIADAE
*Subfamily (A)	NOLINAE
Genus (17)	<b>Celama</b> Walk.

18. **squalida** (Staud.)

Subfamily (B) ARCTIANAE

Genus (18) **Utetheisa** Hübn.19. **pulchella** (Linn.)

Family M. NOCTUIDAE

\*Subfamily (A) HADENINAE

Genus (19) **Polia** Ochs.20. **consanguis** (Guen.)Genus (20) **Polytela** Guen.21. **gloriosae** (Fabr.)

Subfamily (B) ACRONYCTINAE

Genus (21) **Spodoptera** Guen.22. **mauritica** (Bois.)\*Genus (22) **Athetis** Hübn.23. **obtusa** (Hamp.)\*Genus (23) **Chasmina** Walk.24. **sericea** (Hamp.)25. **tibialis** (Fabr.)

\*Subfamily (C) ERASTRIANAE

Genus (24) **Lithacodia** Hübn.26. **signifera** (Walk.)

Subfamily (D) CATOCALINAE

\*Genus (25) **Anua** Walk.27. **coronata** (Fabr.)\*Genus (26) **Euclidisema** Hamp.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** Hübn.  
                   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** Hübn.  
                   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** Lcd.

41. **admixtalis** (Walk.)  
 Subfamily (D) PYRAUSTINAE  
 \*Genus (39) **Hymenia** Hübn.
42. **recurvalis** (Fabr.)  
 \*Genus (40) **Eurrhyarodes** 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. **acropila** 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  
 .....*Euploea*  
 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 anastomosed 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*

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).	<b>Papilio</b> Linnaeus

1. **Papilio polytes romulus** Cramer  
(Plate I)

1775. *Papilio romulus* Cramer, *Pap.Exot.*, 1 : 67, pl.43, fig. A.

1939. *Papilio polytes romulus* : Talbot, *Fauna Brit.India, Butts.*, 1 : 178, figs.46-48, pl.I, figs.18-19.

*Material examined* : LKDA; LKVI.

*Distribution* : India (Throughout the mainland; Lakshadweep). Burma. Sri Lanka. Malay Peninsula. Vietnam.

*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* Hübn. 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)	<b>Eurema</b> Hübner

2. **Eurema hecabe contubernalis** (Moore)  
(Plate I)

1886. *Terias contubernalis* Moore, *J. Linn. Soc. Lond. Zool.*, 21 : 46.

1939. *Eurema hecabe contubernalis* : Talbot, *Fauna Brit. India, Butts.*, 1 : 527, fig. 177.

*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)

1866. *Danaus limniace* var. *leopardus* Butler, *Proc. Zool. Soc. Lond.*, 1866 : 52.

1947. *Danaus limniace leopardus* : Talbot, *Fauna Brit. India*, Butts., 2 : 31, fig.10.

*Material examined* : LAGG; LAVG.

*Distribution* : India (Western and eastern Himalayas; eastern Peninsula; Andaman and Nicobar Islands; Lakshadweep). Pakistan. Burma. Sri Lanka. Western Malaysia. South China. Vietnam.

*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)

1781. *Papilio aglea* Stoll, in Cramer, *Pap. Exot.*, 4 : 377, fig. E.

1947. *Danaus aglea aglea* : Talbot, *Fauna Brit. India*, Butts., 2 : 37.

*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** Fabricius5. **Euploea core core** (Cramer)  
(Plate - II)1780. *Papilio core* Cramer, *Pap. Exot.*, 3 : 133, figs. E,F.1947. *Euploea core core* : Talbot, *Fauna Brit.India*, Butts, 2 : 67.*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** Hübner6. **Mycalesis mineus polydecta** (Cramer)  
[= *polydecta*]1777. *Papilio polydecta* Cramer, *Pap.Exot.*, 2 : 76, pl.144, figs. E,F.1947. *Mycalesis mineus polydecta* : Talbot, *Fauna Brit.India*, Butts., 2 : 136.

*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** Fabricius7. **Melanitis leda ismene** (Cramer)  
(Plate - II)1775. *Papilio ismene* Cramer, *Pap.Exot.*, 1 : 40, pl.26, figs.A.B.1947. *Melanitis leda ismene* : Talbot, *Fauna Brit.India*, Butts., 2 : 366, figs. 96-97.*Material examined* : LAGG; LKDB; LKVI.

*Distribution* : India (Throughout the mainland; Andaman and Nicobar Islands; Lakshadweep). Burma. Sri Lanka. Malayan Subregion. South China. Japan.

*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 Linnaeus (1758) from "Asia" as type of the genus.

Butler (1867) ascertained that the species originated in Amboina from where Linnaeus (*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)

1775. *Papilio violae* Fabricius, *Ent.Syst.*, (3) 1 : 460.

1947. *Acraea violae* : Talbot, *Fauna Brit. India*, Butts., 2 : 466, fig.104.

*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 tenacious 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)

1758. *Papilio cardui* Linnaeus, *Syst. Nat.*, ed. 10 : 475.

1932. *Vanessa cardui* : Evans, *Ident. Indian*, Butts., ed. 2 : 177.

*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 eco-systems 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.

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.

1962. *Spalgis epeus epeus* : Cantlie, *Lycaen. Port. (Except Arhopala gr.) of Brig. Evans' "Ident.Indian Butts. 1932"* p. 30.

*Distribution* : India [Western and eastern Himalayas; eastern and southern Peninsulas; Nicobar group of Islands; U.T.L. (Minicoy)]. Nepal. Burma. Sri Lanka.

*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.]

1775. *Papilio hylax* Fabricius, *Ent.Syst.*, p. 526.

1962. *Zizula hylax* : Cantlie, *Lycaen.Port. (except Arhopala gr.) of Brig. Evans' "Ident. Indian Butts. 1932"*, p. 65.

*Distribution* : India [Eastern Himalayas; Andaman and Nicobar Islands; U.T.L. (Minicoy)]. Pakistan. Burma. Sri Lanka. Maldives. Malayan subregion.

*Remarks* : The species is known to be intermittantly attended by ants in the larval stage for protection.

\*Family H. HESPERIIDAE

[= Hesperidae]

Subfamily HESPERIANE

Genus (11). **Borbo** Evans

12. **Borbo cinnara** (Wallace)

[= *Baoris colaca* M.]

1866. *Hesperia cinnara* Wallace, *Proc. Zool. Soc.Lond.*, 1866 : 361.

1949. *Borbo cinnara* : Evans, *Cat. Hesperiid. Eur. As. Austr. Brit. Mus.*, p. 437.

*Distribution* : India [Western and eastern Himalayas; northern, eastern and southern Peninsulas; Andaman and Nicobar Islands; U.T.L. (Minicoy)]. Burma. Maldives. Malaysia. South China. Taiwan. Vietnam. Australo-Papuan.

*Remarks* : Evans (1949) placed the element under the *Gegenes*-genera group.

Suborder II.	HETEROCERA
*Family I.	SPHINGIDAE
Group	Semanophorae
Subfamily (A).	SESINAE
Tribe	Sesiini
Genus (12).	<b>Cephonodes</b> Hiibner

### 13. *Cephonodes hylas hylas* (Linn.)

1771. *Sphinx hylas* Linnaeus, *Mant.Plant.*, p.539.

1937. *Cephonodes hylas hylas* : Bell & Scott, *Fauna Brit.India*, Sphingidae, 5 : 247, fig. 64, pl.3, figs. 8-9.

*Distribution* : India [Throughout the mainland; U.T.L. (Minicoy)]. Burma. Sri Lanka. Extending eastwards to China and Japan.

*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 Rubiaceae trees and shrubs. It is polyphagous in habit.

Subfamily (B).	PHILAMPELINAE
Tribe	Nephelini
Genus (13).	<b>Macroglossum</b> Scopoli

[= *Macroglossa*]

### 14. *Macroglossum sitiene* (Walker)

1856. *Macroglossa sitiene* Walker, *List Lep. Ins. Brit.Mus.*, 8 : 92 (partim; "Natal"; err.loc.).

1937. *Macroglossum sitiene* : Bell & Scott, *Fauna Brit. India*, Sphingidae, 5 : 378, fig. 90.

*Distribution* : India [Eastern Himalayas; southern Peninsula; U.T.L. (Minicoy)]. Burma. Sri Lanka. Up to the Philippines and China.

*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).	<b>Hippotion</b> Hiibner

### 15. *Hippotion rafflesi* (Butler)

[= *Deilephila theylia* L.]

1877. *Choerocampa rafflesi* Butler, *Trans. zool. Soc.Lond.*, 9 : 556.

1937. *Hippotion rafflesi* : Bell & Scott, *Fauna Brit.India*, Sphingidae, 5 : 422, figs.105, 108, pl.5.

*Distribution* : India [Eastern Himalayas; Western and southern peninsulas; U.T.L. (Minicoy)]. Burma. Sri Lanka. Maldives. Malay. South China.

**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.theylia*", now synonym of *rafflesi*, as "Linn." in place of the correct name "Cramer"

\*Family J.            THYRIDIDAE

Genus (15).        **Striglina** Guenée

### 16. *Striglina scitaria* (Walker)

1862. *Drepanodes scitaria* Walker, *Cat.Lep.Het.Brit.Mus.*, 26 : 1488.

1913. *Striglina scitaria* : Seitz, in Seitz, *Macrolep. World*, 2 : 373, pl.50 f.

**Distribution** : India [Throughout the mainland; Andaman Island; U.T.L. (Minicoy)]. Burma. Sri Lanka. Maldives. Malay Archipelago. Taiwan. Japan. U.S.S.R. Australo-Papuan. Micronesian.

**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.            LYMANTRIIDAE

[= Ocneriadae]

Subfamily        LYMANTRIINAE

Group            Inareolatae

Genus (16).        **Euproctis** Hiibner

### 17. *Euproctis varians* (Walker)

1855. *Artaxa varians* Walker, *Cat.Lep.Het.Brit.Mus.*, 3 : 796.

1933. *Euproctis varians* : Strand, in Seitz, *Macrolep.World*, 10 : 337, pl.45 g.

**Distribution** : India [Western, northern and southern Peninsulas; Andaman Island; U.T.L. (Minicoy)]. Pakistan. Burma. Sri Lanka. Philippines. China. South Africa.

Family L.            ARCTIADAE

\*Subfamily(A).    NOLINAE

Genus (17).        **Celama** Walker

### 18. *Celama squalida* (Staudinger)

1870. *Nola squalida* Staudinger, *Berl. ent. Zeit.*, 14 : 102.

1900. *Celama squalida* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 2 : 24.

**Distribution** : India [Western and eastern Himalayas; western Peninsula; U.T.L. (Minicoy)]. Pakistan. Bhutan. Sri Lanka. Malayan. North China. Middle-East. Europe. Malagassy. Australo-Micronesian.

Subfamily (B). ARCTIANAE

Genus (18). **Utetheisa** Hübner

19. **Utetheisa pulchella** (Linnaeus)

(Plate - III)

1758. *Tinea pulchella* Linnaeus, *Syst. nat.*, ed. 10 : 534.

1901. *Utetheisa pulchella* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 3 : 483, fig. 217.

*Material examined* : LAGG; LBAN; LKDA.

*Distribution* : India (Western Himalayas; western, northern and southern Peninsulas, Lakshadweep). Pakistan. Nepal. Burma. Sri Lanka. Java. Philippines. South and West China. Japan. Afghanistan. Middle-East. Europe. Australo-Papuan. Micronesian.

*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 in spite 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; Plusiadae]

\*Subfamily(A). HADENINAE

Genus (19). **Polia** Ochsenheimer

[ = *Melanchra*]

20. **Polia consanguis** (Guenée)

1852. *Hadena consanguis* Guenee, *Lep. : Noct.*, 2 : 97.

1905. *Polia consanguis* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 5 : 102, fig. 23.

*Distribution* : India [Western and eastern Himalayas; southern Peninsula; U.T.L. (Minicoy)]. Sri Lanka. Sumatra. West China. Japan. Middle-East. Egypt. Ethiopian. Australia.

Genus (20) **Polytela** Guenée

21. **Polytela gloriosae** (Fabricius)

1781. *Bombyx gloriosae* Fabricius, *Sp. Ins.*, 2 : 205.

1905. *Polytela gloriosae* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 5 : 457, fig. 130.

*Distribution* : India [Manipur; Maharashtra; Punjab; 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* (Boisduval)

(Plate - III)

1833. *Hadena mauritia* Boisduval, *Fauna Ent. Madag. Lep.*, p.92, pl.13, fig.9.

1909. *Spodoptera mauritia* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 8 : 256, fig.66

*Material examined* : LAGN.

*Distribution* : India (Western and eastern Himalayas; throughout the Peninsulas; Andaman Island; Lakshadweep). Pakistan. South Burma. Sri Lanka. Sundaland. Philippines. North China. Ethiopio-Malagassic. Australo-Papuan. Hawaiian.

*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 upto 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)

1891. *Caradrina obtusa* Hampson, *Ill. Hel. Brit. Mus.*, 8 : 79, pl.145, fig.6.

1909. *Athetis obtusa* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 8 : 344.

*Distribution* : India [Tamil Nadu; U.T.L. (Minicoy)]. Maldives. Borneo. Hong Kong. Australia.

\*Genus (23). *Chasmina* Walker

[ = *Leocyma* ]

24. *Chasmina sericea* (Hampson)

1893. *Clinophlebia sericea* Hampson, *Ill. Hel. Brit. Mus.*, 9 : 92, pl.161, fig.7.

1910. *Chasmina sericea* : Hampson, *Cat. Lep. Phal. Brit. Mus.*, 9 : 352, fig.161.

*Distribution* : India [U.T.L. (Minicoy)]. Burma. Sri Lanka. Taiwan. Christmas Island. New Caledonia.

*Remarks* : The species is not known from the Indian main land.

25. *Chasmina tibialis* (Fabricius)[ = *cygnus* Walk.]1775. *Noctua tibialis* Fabricius, *Ent.Syst.*, p.578.1910. *Chasmina tibialis* : Hampson, *Cat.Lep.Brit.Mus.*, 9 : 353, fig. 162.

*Distribution* : India [Western and eastern Himalayas; northern and southern Peninsulas; U.T.L. (Minicoy)]. Sri Lanka. Sumatra. Sulawesi. Ethiopio-Malagassic. Australo-Papuan. Tahiti. Rarotonga.

*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[ = *Hyelopsis* ]26. *Lithacodia signifera* (Walker)1857. *Acontia signifera* Walker, *Cat.Lep.Het.Brit.Mus.*, 12 : 793.1910. *Lithacodia signifera* : Hampson, *Cat.Lep.Phal. Brit.Mus.*, 10 : 504.

*Distribution* : India (Western Himalayas; northern, eastern and southern Peninsulas; Andaman Island; U.T.L. (Minicoy)]. Burma. Sri Lanka. Maldives. Western Malaysia. North China. Korea. Japan. North Australia.

Subfamily (D). CATOCALINAE

\*Genus (25). *Anua* Walker[ = *Ophiusa* ]27. *Anua coronata* (Fabricius)1775. *Noctua coronata* Fabricius, *Ent.Syst.*, p.596.1913. *Anua coronata* : Hampson, *Cat.Lep.Phal. Brit.Mus.*, 12 : 427, fig. 101.

*Distribution* : India [Western and eastern Himalayas; throughout the Peninsulas; Andaman Island; U.T.L. (Minicoy)]. Nepal. Bangladesh. Burma. Sri Lanka. Malayan. Malagassic. Australo-Micronesian.

\*Genus (26). *Euclidisema* Hampson[ = *Grammodes* ]28. *Euclidisema mygdon* (Cramer)

(Plate - III)

1777. *Noctua mygdon* Cramer, *Pap.Exot.*, 2 : 94, fig.G.1913. *Euclidisema mygdon* : Hampson, *Cat.Lep.Phal.Brit.Mus.*, 13 : 42, fig. 10.*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

islands including Minicoy)]. South Burma. Sri Lanka. Maldives. Sundaland. North and South China. Japan.

*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)

1858. *Plusia permissa* Walker, *Cat.Lep.Het.Brit.Mus.*, 15 : 1786.

1913. *Phytometra permissa* : Hampson, *Cat.Lep.Phal. Brit.Mus.*, 13 : 497, fig.123.

*Distribution* : India [Southern Peninsula; U.T.L. (Minicoy)]. Sri Lanka. Maldives.

*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)

1857. *Toxocampa metaspila* Walker, *Cat.Lep.Het. Brit. Mus.*, 13 : 1032.

1894. *Polydesma metaspila* : Hampson, *Fauna Brit. India. Moths*, 2 : 469.

*Distribution* : India [Maharashtra; Tamil Nadu; Kerala; U.T.L. (Minicoy)]. Sri Lanka. Java. Fiji.

*Remarks* : Hampson (1894) considered this moth under the subfamily "Quadrifini" Later, Warren (1914) treated the genus under Noctuidae, as presently adopted.

\*Genus (29). *Simplicia* Guenée

### 31. *Simplicia robustalis* (Guenée)

1854. *Herminia robustalis* Guenée, *Delt.et.Pyral.*, p.58.

1895. *Simplicia robustalis* : Hampson, *Fauna Brit. India, Moths*, 3 : 36, fig.16.

*Distribution* : India [Throughout the mainland; U.T.L. (Minicoy)]. Pakistan. Burma. Sri Lanka. Maldives. Malayan. Australian. Sandwich Island.

*Remarks* : Earlier Hampson (1895) considered this and the following three genera under the subfamily "Deltoidinae" But all these are placed here under Noctuidae *sensu* Warren (1914).

\*Genus (30). **Hydrillodes** Guenée32. **Hydrillodes lentalis** Guenée

1854. *Hydrillodes lentalis* Guenée, *Delt. et Pyral*, p.66, pl. 5, fig. 3.

*Distribution* : India [Throughout the mainland; Andaman Island; U.T.L. (Minicoy)]. Burma. Sri Lanka. Borneo. Sulawesi. Japan. South Africa. Australia.

*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)

1858. *Hypena indicatalis* Walker, *Cat.Lep.Het.Brit.Mus.*, 16 : 61.

1914. *Bomolocha indicatalis* : Warren, in Seitz, *Macrolep.World*, 3 : 434, pl. 73 e.

*Distribution* : India [Throughout the mainland; U.T.L. (Minicoy)]. Burma. Sri Lanka. Malayan. North China. Korea. Japan. South Africa.

Family N. GEOMETRIDAE

[ = Selidosemidae; Sterrhidae ]

Subfamily (A). GEOMETRINAE

\*Genus (32) **Boarmia** Treitschke

[ = *Ascotis* ]

34. **Boarmia boarmiaria** (Guenée)

1857. *Hypochroma boarmiaria* Guenée, *Lep.: Uranides et Phalenites*, 1 : 282.

1895. *Boarmia boarmiaria* : Hampson, *Fauna Brit.India*, Moths, 3 : 261.

*Distribution* : India [Eastern Himalayas; U.T.L. (Minicoy)]. Sri Lanka. Taiwan.

*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). ACIDALIINAE

Genus (33). **Acidalia** Treitschke

[ = *Leptomeris* ]

35. **Acidalia addictaria** Walker

1861. *Acidalia addictaria* Walker, *Cat. Lep. Het. Brit. Mus.*, 22 : 749.

*Distribution* : India [Western and eastern Himalays; 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 Acidaliinae. But Prout (1912) relegated "*Leptomeres*", "*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 aspelataria* Walker

1861. *Acidalia aspelataria* Walker, *Cat.Lep. Het.Brit.Mus.*, 23 : 791.

*Distribution* : India [U.T.L. (Minicoy)]. Bhutan. Sri Lanka.

*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.      TORTRICIDAE

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).      PHYCITINAE

Genus (36).      *Epicrocis* Zeller

[ = *Canthelea* ]

### 39. *Epicrocis lateritialis* (Walker)

1863. *Eurhodope lateritialis* Walker, *Cat.Lep.Het. Brit. Mus.*, 27 : 74.

1896. *Epicrocis lateritialis* : Hampson, *Fauna Brit. India, Moths*, 4 : 86.

*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)

1859. *Doththa mesenterialis* Walker, *Cat.Lep.Het.Brit.Mus.*, 17 : 285.

1896. *Endotricha mesenterialis* : Hampson, *Fauna Brit. India.*, Moths, 4 : 133, fig.75.

*Distribution* : India [Western Himalayas; western and southern Peninsulas; U.T.L. (Minicoy)]. Burma. Sri Lanka. Maldives. Malayan. Taiwan.

\*Subfamily (C).      NYMPHULINAE

Genus (38).          Bradina Lederer

[ = *Pleonectusa* ]

41. *Bradina admixtalis* (Walker)

(Plate - III)

1859. *Botys admixtalis* Walker, *Cat.Lep.Het.Brit.Mus.*, 18 : 665.

1896. *Bradina admixtalis* : Hampson, *Fauna Brit. India.*, Moths, 4 : 227.

*Material examined* : LKVV.

*Distribution* : India [Throughout the mainland; U.T.L. (both the northern and southern islands including Minicoy)]. Burma. Sri Lanka. Maldives. Western Malaysia. Japan. Ethiopian region.

*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)

1794. *Phalaena recurvalis* Fabricius, *Ent. Syst.*, p.237.

1939. *Hymenia recurvalis* : Klima, *Lep.Cat.*, 89 : 31.

*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, Palaearctic Asia from Syria to Japan, Ethiopia-Malagassic, 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*

and *Beta vulgaris*. Hampson (1896, 1898) considered the species as "*Zinckenia fascialis* Cr.". But here the nomenclature is adopted *sensu* Klima (1939).

\*Genus (40).            **Eurrhyarodes Snellen**

[ = *Molybdantha* ]

43. **Eurrhyarodes tricoloralis** (Zeller)

1852. *Botys tricoloralis* Zeller, *Kgl.Vet.Akad.Handl. Micropt.Caffr.*, p.31.

1939. *Eurrhyarodes tricoloralis* : Klima, *Lep.Cat.*, 89 : 37.

*Distribution* : India [Northern, eastern and southern Peninsulas; South Andaman, U.T.L. (Minicoy)]. Sri Lanka. Maldives. Sino-Malayan. Australo-Micronesian.

*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.

1898. *Ercta ornatalis* : Hampson, *Proc.zool.Soc.Lond.*, 1898 : 637.

*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 pentodes* 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, *interlia*, 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)

1859. *Botys niphealis* Walker, *Cat.Lep.Het.Brit.Mus.*, 18 : 638.

1939. *Lamprosema niphealis* : Klima, *Lep.Cat.*, 89 : 162.

*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* (Fabr.) being popularly known as the cotton Leaf-roller.

\*Genus (45). **Epichronistis** Meyrick

48. **Epichronistis acrospila** Meyrick

1886. *Epichronistis acrospila* Meyrick, *Trans.ent. Soc.Lond.*, 1886 : 261.

*Distribution* : India [U.T.L. (Minicoy)]. Maldives. Mauritius. Fiji.

*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)

1851. *Eudiptes indica* Saunders, *Trans.ent.Soc.Lond.*, (2) 1 : 163, pl.12, figs. 5-7.

1939. *Diaphania indica* : Klima, *Lep.Cat.*, 94.

*Material examined* : LKDA.

*Distribution* : India (Western and eastern Himalayas; throughout the Peninsulas; Andaman and Nicobar Islands; Lakshadweep). Pakistan. Burma. Sri Lanka. Maldives. Java. Sulawesi. South China. Ethiopian. Australian.

*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** Guenée

[ = *Margaronia* ]

50. **Glyphodes suralis** Lederer

1863. *Glyphodes suralis* Lederer, *Ent.Monat.*, p.405, pl.14, fig.9.

*Distribution* : India (Nicobar Island; U.T.L. (Minicoy)]. Maldives. Amboina. Solomons. Gilbert. Ellice. Marshall Island.

*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,

*Distribution* : India [Throughout the mainland; Andaman Island; U.T.L. (Minicoy)]. Pakistan. Burma. Sri Lanka. Malayan. South Africa.

*Remarks* : The species is known to feed on the fruits of *Solanum melongela* in the Indian mainland.

\*Genus (49). **Ischnurges** Lederer

**52. Ischnurges gratiosalis** (Walker)

1859. *Samea gratiosalis* Walker, *List Lep.Ins.Coll.Brit.Mus.*, 17 : 357.

1899. *Ischnurges gratiosalis* : Hampson, *Proc. zool.Soc.Lond.*, 1899 : 188, fig.100.

*Distribution* : India [Eastern Himalayas; southern Peninsula; Nicobar Island; U.T.L. (Minicoy)]. Sri Lanka. Maldives. Malayan. North China.

*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 Rubiaceae 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 Uttar Pradesh 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 unknown from the Minicoy Island. Contrarily, species like *Acraea violae*, *Spalgis epeus*, *Polytela gloriosae*, *Phytometra permissa*, *Acidalia addictaria*, *A. aspilataria* and *Epicrocis 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.]

- |   |                |
|---|----------------|
| 1. <i>Abutilon indicum</i><br>[Kattiparathi]    | Malvaceae      |
| 2. <i>Aegle marmelos</i> (1)                    | Rutaceae       |
| 3. <i>Albizia lebbeck</i> (2)<br>[Vaga]         | Leguminosae    |
| 4. <i>Artemisia</i> sp. (9)                     | Asteraceae     |
| 5. <i>Artocarpus communis</i><br>[Chakka]       | Moraceae       |
| 6. <i>Blumea membranacea</i> (9)<br>[Pacha]     | Asteraceae     |
| 7. <i>Caesalpinia</i> spp. (2)                  | Leguminosae    |
| 8. <i>Calotropis</i> sp. (3,4)                  | Asclepiadaceae |
| 9. <i>Capparis heyneana</i>                     | Capparidaceae  |
| 10. <i>Carica papaya</i> [Papaya]               | Papaveraceae   |
| 11. <i>Caryophyllum inophyllum</i><br>[Punna]   | Guttiferae     |
| 12. <i>Cassia fistula</i> (2)                   | Leguminosae    |
| 13. <i>C. tora</i> (2)                          | Leguminosae    |
| 14. <i>Casuarina equisetifolia</i><br>[Shabook] | Casuarinaceae  |
| 15. <i>Cerebera odollum</i><br>[Kandala]        | Apocynaceae    |
| 16. <i>Chloroxylon swietenia</i>                | Rutaceae       |
| 17. <i>Citrus medica</i> (1)                    | Rutaceae       |
| 18. <i>Citrus</i> sp. (cultivated) (1)          | Rutaceae       |
| 19. <i>Cocos nucifera</i> [Thengu]              | Palmae         |
| 20. <i>Cucumis sativus</i> (8)<br>[Cucumber]    | Cucurbitaceae  |

- |  |                |
|--|----------------|
| 21. <i>Cucurbita minima</i><br>[Peerakka]    | Cucurbitaceae  |
| 22. <i>C. pepo</i><br>[Pumpkin] (49)         | Cucurbitaceae  |
| 23. <i>Crataeva religiosa</i>                | Capparidaceae  |
| 24. <i>Cryptolepis buchanani</i> (4)         | Asclepiadaceae |
| 25. <i>C. elegans</i> (5)                    | Asclepiadaceae |
| 26. <i>Debregeasia bicolor</i> (9)           | Urticaeae      |
| 27. <i>Dregea volubilis</i> (3)              | Asclepiadaceae |
| 28. <i>Erithrina indica</i><br>[Murikku]     | Leguminosae    |
| 29. <i>Ficus bengalensis</i> (5)<br>[Peral]  | Urticaceae     |
| 30. <i>F. glomerata</i> (5)                  | Urticaceae     |
| 31. <i>F. indica</i> (5)                     | Urticaceae     |
| 32. <i>F. religiosa</i> (5)<br>[Palalam]     | Urticaceae     |
| 33. <i>Glycosmis pentaphylla</i> (1)         | Rutaceae       |
| 34. Grasses (6,7)                            | Poaceae        |
| 35. <i>Hemidesmus indicus</i> (5)            | Asclepiadaceae |
| 36. <i>Hibiscus cannabinus</i> (8)           | Malvaceae      |
| 37. <i>Holarrhena antidysenterica</i> (5)    | Apocynaceae    |
| 38. <i>Hoya sp.</i> (3)                      | Asclepiadaceae |
| 39. <i>Ichnocarpus frutescens</i> (5)        | Apocynaceae    |
| 40. <i>Ipomoea batatas</i><br>[Sweet Potato] | Convolvulaceae |
| 41. <i>I. biloba</i> [Patala]                | Convolvulaceae |
| 42. <i>I. rootens</i> [Mullankizhang]        | Convolvulaceae |
| 43. <i>Lantana camara</i> (11)<br>[Arippu]   | Verbenaceae    |
| 44. <i>Manihot utilisima</i><br>[Tapioca]    | Euphorbiaceae  |

- |   |                |
|---|----------------|
| 45. <i>Marsdenia tenacissima</i> (3)            | Asclepiadaceae |
| 46. <i>Melia</i> sp. [Alivapu]                  | Meliaceae      |
| 47. <i>Modecca palmata</i> (8)                  | Passifloraceae |
| 48. <i>Morinda tinctoria</i> (13)<br>[Molam]    | Rubiaceae      |
| 49. <i>Moringa pterigosperma</i><br>[Muringa]   | Moringaceae    |
| 50. <i>Murraya koenigii</i> (1)                 | Rutaceae       |
| 51. <i>Musa sapientum</i><br>[Vazha]            | Musaceae       |
| 52. <i>Nelsonia campestris</i> (11)             | Acanthaceae    |
| 53. <i>Nerium odorum</i> (5)<br>[Nerium]        | Apocynaceae    |
| 54. <i>N. oleander</i> (5)                      | Apocynaceae    |
| 55. Palms                                       | Palmae         |
| 56. <i>Pandanus fascicularis</i><br>[Kaitha]    | Pandanaceae    |
| 57. <i>Passiflora foetida</i> (8)               | Passifloraceae |
| 58. <i>Pemphis acidula</i><br>[Chonnam]         | Lythraceae     |
| 59. <i>P. stierongii</i><br>[Cheruthalam]       | Lythraceae     |
| 60. <i>Physalis minima</i><br>[Kurumottam]      | Solanaceae     |
| 61. <i>Pithecolobium dulce</i> (2)              | Leguminosae    |
| 62. <i>Ricinus communis</i><br>[Avinakku]       | Euphorbiaceae  |
| 63. <i>Ruta graveoleus</i>                      | Rutaceae       |
| 64. <i>Saccharum officinarum</i><br>[Sugarcane] | Poaceae        |
| 65. <i>Scavola koenigii</i><br>[Kanni]          | Goodenovieae   |
| 66. <i>Sesbania aculeata</i> (2)                | Leguminosae    |

- |  |                |
|--|----------------|
| 67. <i>Spinifex squaroses</i> (19)<br>[Mulli]          | Poaceae        |
| 68. <i>Stachytarphata indica</i><br>[Chakkarappullu]   | Verbenaceae    |
| 69. <i>Streblus asper</i> (5)                          | Urticaceae     |
| 70. <i>Strobilanthes</i> sp. (11)                      | Acanthaceae    |
| 71. <i>Tamarindus indica</i><br>[Puli]                 | Leguminosae    |
| 72. <i>Taraxacum officianale</i><br>[Nalukalan]        | Asteraceae     |
| 73. <i>Techoma stans</i><br>[Manchapoovu]              | Bignoniaceae   |
| 74. <i>Terminalia catapa</i><br>[Alum]                 | Combretaceae   |
| 75. <i>Thespesia maculata</i><br>[Kinnamparathi]       | Malvaceae      |
| 76. <i>T. populnea</i><br>[Cheerani]                   | Malvaceae      |
| 77. <i>Tournefortia argentia</i><br>[Thamara]          | Boraginaceae   |
| 78. <i>Trichosanthus cucumerina</i><br>[Kattupatavala] | Cucurbitaceae  |
| 79. <i>Tylophora carnososa</i> (4)                     | Asclepiadaceae |
| 80. <i>Vetches</i> (11)                                | Leguminosae    |
| 81. <i>Wagatea spicata</i> (2)                         | Leguminosae    |
| 82. <i>Zanthoxylum rhetsa</i> (1)                      | Rutaceae       |
| 83. <i>Zizyphus jujuba</i><br>[Elanthappazham]         | Rhamnaceae     |
| 84. <i>Zorina diphylla</i> (9)                         | Asteraceae     |

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")

Codes	Localities decoded	Date of Colln.	Sl.No. **	No. of exs.		Exp. (in mm.)	Field observations made by the author
				m.	fem.		
I	II	III	IV	V	VI	VII	VIII
LAGA	Lakshadweep: Agatti, in and around the Agricultural Farm, c 2 kms. south of Guest House	3.iv.1984	9	1	1	55-60	The island, c 57 kms. from Kavaratti, being quite linear and very much narrow at the southern end, whence one of its attached islets, i.e., Kalpitti, only c 50 metres off, could be negotiated on foot during a brief interval of low-tide hours. Vegetation almost similar to that of the Deccan in the mainland. Vegetation almost similar to that of the Deccan in the mainland. At Agatti, garbages found to be piled up at places. Brief spell of rain accompanied by thunder experienced for a couple of days, otherwise the climate remaining very hot. After rains, solitary examples of a few species of Noctuidae, like <i>Anua coronata</i> and of Pyralidae like <i>Lamprosema niphealis</i> , <i>Glyphodes suralis</i> , <i>Leucinodes orbonalis</i> and probably <i>Ischnurges gratiosalis</i> could be observed at repose high up around the street neon lights off the Guest House. Besides, certain butterfly species like <i>Valeria valeria</i> (Pieridae), <i>Elymnias hypermnestra</i> (Satyridae), <i>Precis lemonias</i> (Nymphalidae) in association with <i>Papilio demoleus</i> and <i>Neopithecops zalmora</i> also observed at day time in their relevant habitats both at Agatti and Kalpitti, but all in singletons, too.
LAGG	Lakshadweep: Agatti, in and around the Guest House Compound	4.iv.1984	3	—	1(§)	74	
		4.iv.1984	4	—	1(§)	70	
		4.iv.1984	5	—	1(§)	82	
		4.iv.1984	7	2(§)	—	75-76	
		5.iv.1984	19	1(§)	—	37	
LAGN	Lakshadweep: Agatti, towards north of, around a radius of c 2 kms.	8.iv.1984	22	1		28	

I	II	III	IV	V	VI	VII	VIII
LAVG	Lakshadweep: Amini, Vegetable garden located at c 2 kms. from jetty	13.iv.1984 13.iv.1984	3 8	1 1	— —	92 62	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 <i>Euschema percota</i> was also observed in association with <i>Atrophaneura hector</i> and <i>Danaus genutia</i> amidst bushes.
LBAN	Lakshadweep: Bangaram, c 15 kms. north of Agatti	7.iv.1984	19	1	—	40	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 <i>Danaus chrysippus</i> , Geometrid <i>Hemithea</i> sp. and Arctiid <i>Cretonotus</i> sp. also seen along the sandy lagoon beach in the sunny climate.
LKDA	Lakshadweep: Kadmat, Agricultural Farm, c 3 kms. north of Dak Bungalow	12.iv.1984 12.iv.1984 12.iv.1984	1 19 49	— — 1	1 1 —	90 39 24	This island, c 76 kms. from Kavaratti, being provided with a sand bank south cape; soil mostly rocky, supporting rather less dense vegetation; supra-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.
LKDB	Lakshadweep: Kadmat, in and around Dak Bungalow compound	13.iv.1984	7	1(\$)	—	68	

I	II	III	IV	V	VI	VII	VIII
LKVD	Lakshadweep: Kavaratti, Defence Area, c 2 kms. south of Govt. Guest House	30.iii.1984	2	—	1	40	This is the first-surveyed island, c 404 kms. from Cochin, being marked by coralline sand intermingled with rocks in the west; area in the extreme north very dry; climate too hot. Vegetation predominated by coconuts, as usual for the rest of U.T.L., and also other cultivated or introduced trees and shrubs, such as, "Neem", "Papaya", <i>Polyalthia</i> , "Sajina" brinjal, wild jackfruit, sweet potato, gourd, lemons, sword-beans, grasses, vetches, various weeds forming thick bushes, etc. Certain representatives of Lepidopterous species like <i>Atrophaneura aristolochiae</i> , <i>Leptosia nina</i> , <i>Papilio demolous</i> , <i>Dichromia orosia</i> , <i>Euschema percota</i> , etc., could also be observed, but none in plenty.
LKVI	Lakshadweep: Kavaratti, Indira Nagar, c 3 kms. east of P.W.D. Rest House	29.iii.1984 29.iii.1984	1 7	— —	1 1	98 70	
LKVV	Lakshadweep: Kavaratti, Vegetable garden, c 3 kms. east of Govt. Tourist Hut.	28.iii.1984 28.iii.1984 28.iii.1984	28 41 42	1 1 1	— — —	26 22 22	

\*\* 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.*)

Sl. No.	Name of spp. / sspp.	Oriental											Palearctic										
		Indian											Malayan	Chinese	Eastern	Western	Ethiopian	Malagassic	Australian	Papuan	Hawaiian	Neotropical	Nearctic
		Extra-Peninsular		Peninsular				Insular				Elsewhere											
		Western	Eastern	Western	Northern	Eastern	Southern	Andaman	Nicobar	Northern Islands	Lakshadweep												
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
1.	<i>Princeps polytes romulus</i>	+	+	+	+	+	+		+	N		+5-6	+	+									
2.	<i>Eurema hecabe contubernalis</i>	+	+			+				N		+5	+										
3.	<i>Danaus limniace leopardus</i>	+	+			+		+	+	N		+1,5-6	+	+									
4.	<i>Danaus a. aglea</i>					+	+			N		+6											
5.	<i>Euploea c. core</i>	+	+	+	+	+	+			N													
6.	<i>Mycalesis mineus polydecta</i>			+		+	+				+	+6-7											
7.	<i>Melanitis leda ismene</i>	+	+	+	+	+	+	+	+	N		+5-6	+	+	+								
8.	<i>Acraea violae</i>	+		+	+	+	+			N		+1,6											
9.	<i>Vanessa cardui</i>	+	+	+	+	+	+	+		N		+1-7	+	+	+	+	+	+	+	+	+	+	+
10.	<i>Spalgis epeus</i>	+	+			+	+		+		+	+2,5-6											
11.	<i>Zizula hylax</i>		+					+	+		+	+1,5-7	+										
12.	<i>Borbo cinnara</i>	+	+		+	+	+	+	+		+	+5,7	+	+					+	+			
13.	<i>Cephonodes h. hylas</i>	+	+	+	+	+	+				+	+5-6		+	+								
14.	<i>Macroglossum sitiene</i>		+				+				+	+5-6	+	+									
15.	<i>Hippotion rafflesi</i>		+	+		+	+				+	+5-7	+	+									
16.	<i>Striglina scitaria</i>	+	+	+	+	+	+	+			+	+5-7	+	+	+					+	+	+	+
17.	<i>Euproctis varians</i>			+	+		+	+			+	+1,5-6	+	+			+						
18.	<i>Celama squalida</i>	+	+	+							+	+1,3,6	+		+	+	+	+	+	+	+	+	+
19.	<i>Utetheisa pulchella</i>	+		+	+		+				N	+1-2,5-6	+	+	+	+			+	+	+	+	+
20.	<i>Polia consanguis</i>	+	+				+				+	+6	+		+				+	+	+	+	+
21.	<i>Polytela gloriosae</i>		+	+	+	+	+				+	+6	+						+	+	+	+	+
22.	<i>Spodoptera mauritia</i>	+	+	+	+	+	+	+		N		+1,5-6	+		+			+	+	+	+	+	+
23.	<i>Athetis obtusa</i>						+				+	+7	+	+						+	+	+	+
24.	<i>Chasmina sericea</i>										+	+5-6	+	+								+	+
25.	<i>Chasmina tibialis</i>	+	+		+		+				+	+6	+				+				+	+	+
26.	<i>Lithacodia signifera</i>	+			+	+	+	+			+	+5-7	+		+						+	+	+



## RÉSUMÉ

Un compte rendu taxonomique de liste 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 extending 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.

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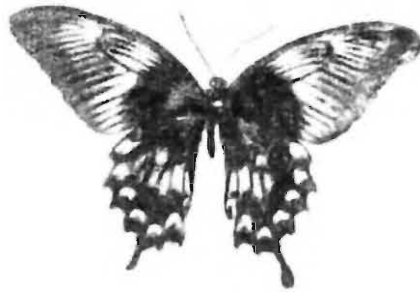
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MANDAL

PLATE I

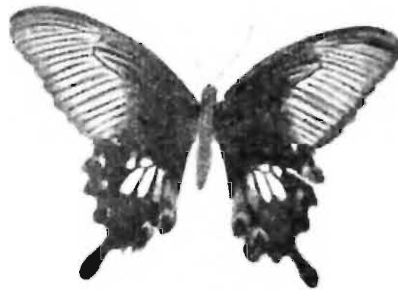
1A i



1A ii



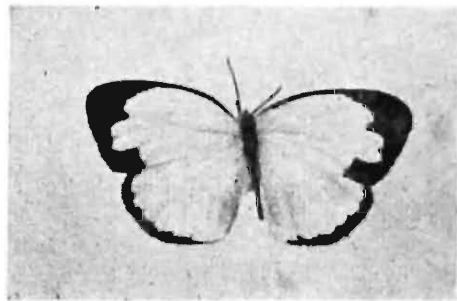
1B ii



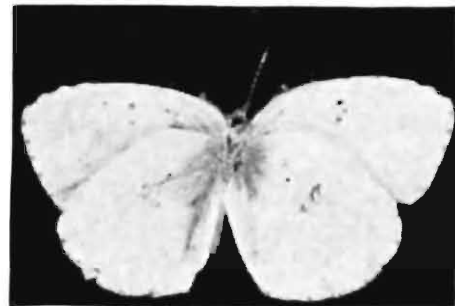
1B i



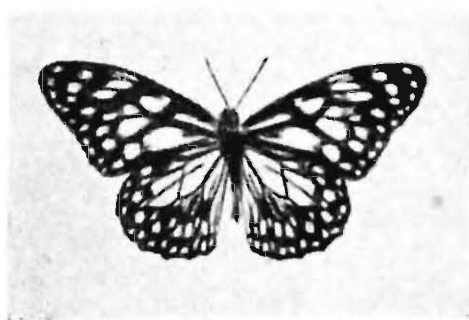
2A



2B



3



4

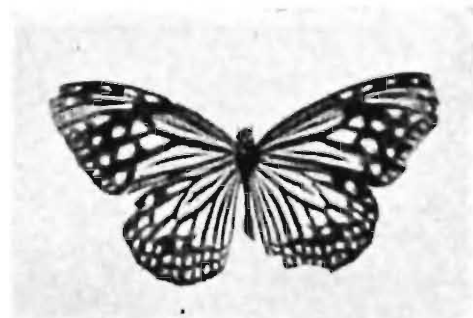


Fig. 1. *Papilio polytes romulus* : A, f. (Female) *romulus* (i, dorsal & ii, ventral views) ;  
B, f. (Female) *stichius* (i, dorsal & ii, ventral views)  
Fig. 2. *Eurema hecabe contubernalis*, w.s.f. *merguiana* : A, dorsal & B, ventral views  
Fig. 3. *Danaus limniace leopardus* : dorsal view.  
Fig. 4. *Danaus aglea aglea* : dorsal view.

MANDAL

PLATE II

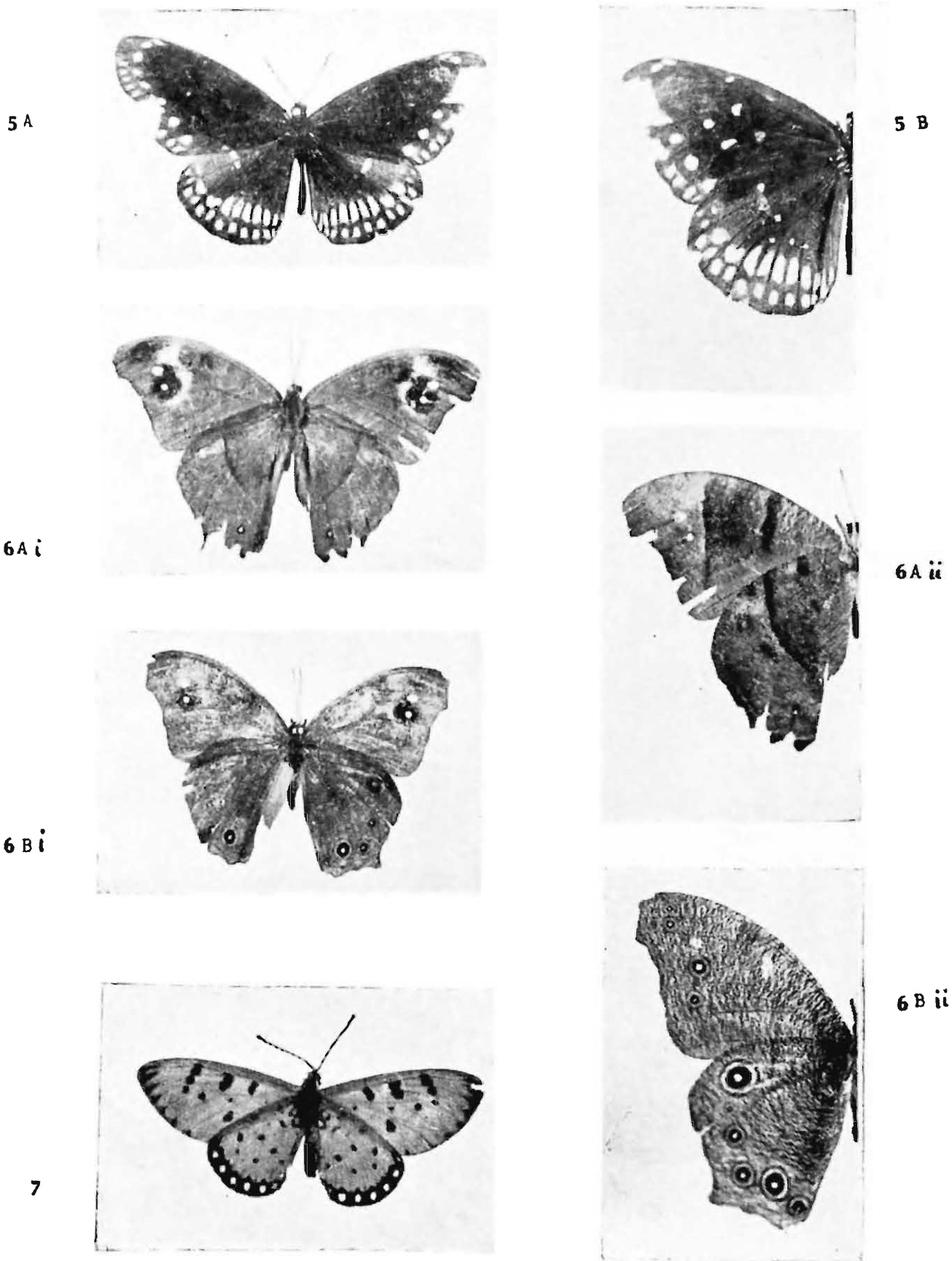


Fig. 5. *Euploea core core* : A, dorsal & B, ventral views.

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. *Acraea violea* : dorsal view.

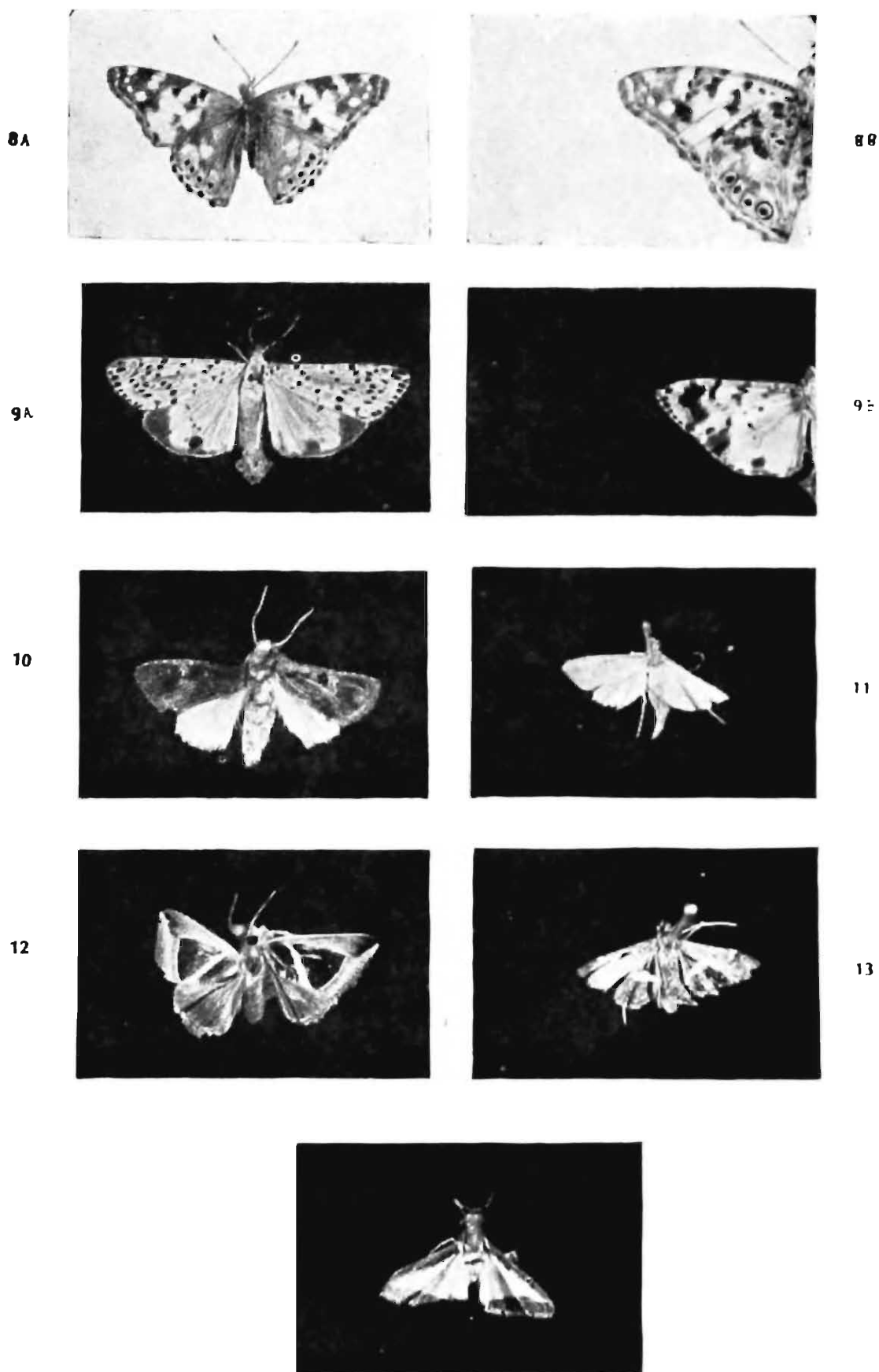


Fig. 8 *Vanessa cardui* : A, dorsal & B, ventral views. Fig. 9. *Utetheisa pulchella*, f. *tenuella* : A, dorsal & B, ventral views. Fig. 10. *Spodoptera mauritia* : dorsal view. Fig. 11. *Bradina admixtalis* : dorsal view. Fig. 12. *Euclidesema mygdon* : dorsal view. Fig. 13. *Hymenia recurvalis* : dorsal view. Fig. 14. *Diaphania indica* : dorsal view.

MANDAL

PLATE IV

15



16



17



18



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)\*

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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 Malayasian 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 Malayasian and Indonesian one and *A. s. simulatrix* is mostly an African species. The Indian influence is exhibited along with other oriental countries by the presence of *A. humberianus*, *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)

1773. *Gryllus flavescens* Fabricius, *Ent. Syst.*, 2 : 52.

*Material* : 5♂, 3♀; Minicoy Island; 15-16.2.86.

*Remarks* : Known previously from Tamil Nadu, Andhra Pradesh, Orissa (Barkuda Island) in India and SriLanka, 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 mm vs. 70 - 71 mm).

2. *Acrotylus humberianus* Saussure

1884. *A. humberianus* Saussure, *Mem.Soc.phys.Hist.nat. Geneva*, 28 (9) : 189.

*Material* : 7♂; 5♀; Kavaratti Island, 8.2.86.

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\* 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 Afganistan and Sri Lanka.

### 3. *Catantops innotabilis* (Walker)

1870. *Acridium innotabile* Walker, *Cat. Derm. Salt. Br. Mus.*, 4 : 629.

*Material* : 2 ♂; Minicoy Island; 12- 2.86. 3 ♂, 3 ♀ (and 1 ♀ nymph); Kavaratti; 7.2.86.

*Remarks* : A very common species in India, Afganistan, Korea and Sri Lanka.

### 4. *Aiolopus simulatris simulatris* (Walker)

1870. *Epacromia simulatris* Walker, *Cat. Derm. Salt. Br. Mus.*, 4 : 773.

*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. Lr. Mus. nat. Hist. (Ent.)*, 22 (7) : 320, figs.). The species is an annual breeder.

## Family GRYLLIDAE

### 5. *Ectatoderus ceylonicus* Chopard

1928. *E. ceylonicus* Chopard, *Spol. Zeyl.*, 14 : 202, figs 7-10.

*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 Malayasian 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 PYRGOMORPHIDAE

### 7. *Atractomorpha crenulata crenulata* (Fabricius)

1793. *Truxalis crenulata* Fabricius, *Ent. Syst.*, 2 : 28.

*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)**

1864. *Forficesila stali* Dohrn, *Stettin ent. Ztg.*, 25 : 286 (fem;Java).

1970. *Euborellia stali* : Sakai 1970, *Dermapterorum Cat. Prael*, No.1 : 29.

1976. *Euborellia stali* : Srivastava, *Rec.zool.Surv.India,Occ.pap.*, No.2 : 27.

*Material examined* : INDIA : Union Territory of Lakshadweep, Indira Nagar, 2 kms SE of P.W.D. Rest House, Kavaratti I., 2 females, 29.iii.1984; Defence area, 4 kms S. of Govt. Rest House, Kavaratti Id., 2, 30.iii.1988; Agricultural Garden, Amini Id., 1 female, 13.iv.1984; D. K. Mandal coll.

*Diagnostic characters* : General colour blackish brown to black; antennae with one or two anteapical segments yellow but position variable.

Pronotum gently widened posteriorly. Elytra abbreviated 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.

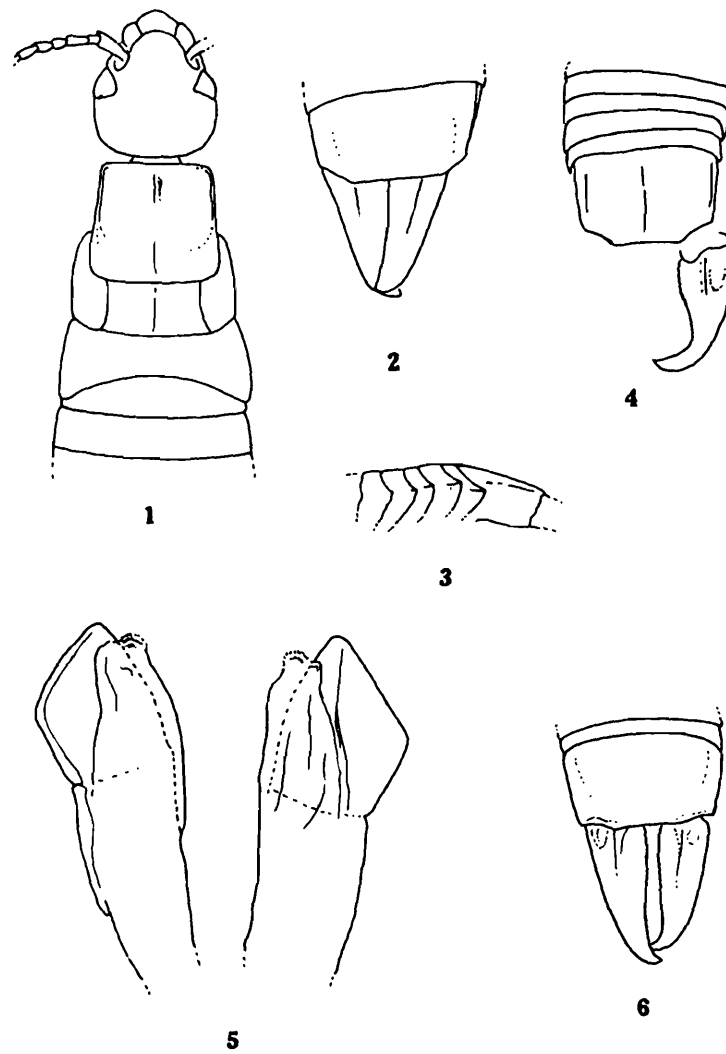
**2. *Euborellia* sp.**

*Material examined* : INDIA : Union Territory of Lakshadweep, North of Agatti Id, 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, striate, carinate, but carina 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.

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**INSECTA : DICTYOPTERA**

K. P. MUKHERJEE and A. K. HAZRA  
*Zoological Survey of India, Calcutta.*

Family EPILAMPRIDAE

Subfamily EPILAMPRINAE

**1. Rhabdoblatta lineaticollis (Bolivar)**

1897. *Epilampra lineaticollis* Bolivar, *Ann. Soc. ent. France*, 66 : 298.

1964. *Rhabdoblatta lineaticollis* : Mc Kittrick, *Cornell Univ. Agr. Exp. Sta. Mem.*, 389 : 17, 40, 44, 63, 82.

*Material studied* : 1 ex., 2 kms. east of Guest House, Agatti Island, 5.iv.1984.

*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.

Family EPILAMPRIDAE

Subfamily PHORASPIDINAE

**2. Thorax porcellana Saussure**

1863. *Phoraspis porcellana* Saussure, *Mém. Soc. Genève*, 17 : 142.

1967. *Thorax porcellana* : Princis, *Orthopterorum Catalogus*, Pars 11 : 640.

*Material studied* : 2 exs., Agriculture farm, 2 kms. south of Guest House, Agatti Island, 3.iv.1984.

*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.

Family EPILAMPRIDAE

Subfamily PHORASPIDINAE

**3. Haanina patinifera (Bolivar)**

1897. *Homalopteryx patinifera* Bolivar, *Ann. Soc. ent. France*, 66 : 296

1967. *Haanina patinifera* : Princis, *Orthopterorum Catalogus*, Pars 11 : 644.

*Material studied* : 1 ex., north of Agatti Island along the costal embarkment, 8.iv.1984.

*Description* : Head black and yellow; fifth palpal joint one and halftimes 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.

1969. *Blattella germanica* : Princis, *Orthopterorum Catalogus*, Pars 13 : 807.

*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

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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

1758. *Musca domestica* Linnaeus, *Syst. Nat. Ed.*, 10, 1 : 596.

1977. *Musca (Musca) domestica* : Pont, *A Catalog of Diptera of the Oriental Region*, 3 : 459.

*Material examined* : 2 ♂, 4 ♀, Indira Nagar Kavaratti, 29. iii. 1984.

*Remarks* : The species is cosmopolitan and has earlier been recorded from Maldivian islands (Pont, 1977).

Family SARCOPHAGIDAE

Subfamily SARCOPHAGINAE

3. *Parasarcophaga (Parasarcophaga) albiceps* (Meigen)

1826. *Sarcophaga albiceps* Meigen, *Syst. Besch. europ. zweifl. Insekt.*, 5 : 22.

1977. *Parasarcophaga (Parasarcophaga) albiceps* : Lopes, Kano, Shinonaga & Kurahashi, *A Catalog of Diptera of the Oriental Region*, 3 : 570.

*Material examined* : 1 ♂, Amini island, ca. 12 km. south of Kadmat island, 13.iv.1984.

*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

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INSECT : MANTODEA

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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	MANTINAE
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) :

	<i>Body</i>	<i>Pronotum</i> (L/B)	<i>Metazona</i>	<i>Fore wing</i>
<i>male</i>	53-64	19/7.5	12	46
<i>female</i>	75	23/8.5	15.5	55

*Material examined* : 1 ♂ Agatti Guest House Compound, (at light), 4.iv.1984, 1 nymph, Kadmal Is., Agricultural Garden, Stn.16. 11.iv.1984, 1 ♀, around Dak Bunglow, Kadmal Is., 11.iv.1984; 1 ♀, 1 nymph, Agatti Is., around Agricultural Farm, Stn. 10, 3.iv.1984.

*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 thankful 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.

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INSECTA : COLEOPTERA

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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 DYTISCIDAE

1. *Eretes stictus* (Linnaeus)

1767. *Dytiscus stictus* Linnaeus, *Syst. Nat. ed. 12* : 666.

1833. *Eretes stictus* : Castelnau, *Ann. Soc. ent. Fr.*, (5) 8 :450.

*Material examined* : 1 ex., Agatti, 3.4.1984. D. K. Mandal coll.

*Distribution* : Very widely distributed species known from almost all parts of the world.

Suborder POLYPHAGA

Family STAPHYLINIDAE

2. *Paederus fuscipes* Curtz.

1823-40. *Paederus fuscipes* Curtis, *Ent. Brit.* 3 : 108.

1931. *Paederus fuscipes* Cameron, *Fauna Brit. India*, Staphylinidae, 2 : 40-41.

*Material examined* : 1 ex., Agatti, 13.4.1984. D.K. Mandal coll.

*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.)

1758. *Scarabaeus rhinoceros* Linnaeus, *Syst. Nat.*, 1 : 346.

1910. *Oryctes rhinoceros* : Arrow. *Fauna Brit. India*, *Scarabaeidae*, 1 : 278 280.

*Material examined* : 3 exs. Agatti, 3.4.1984. D. K. Mandal Coll.

*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, Karnatak 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

1858. *Onthophagus difficilis* Walker, *Ann.Mag.Nat.Hist* (3) 2 : 209.

1931. *Onthophagus difficilis* Arrow : *Fauna Brit.India*, Scarabaeidae, 3 : 306-307.

*Material examined* : 2 exs. Agatti, 3.4.1984. D. K. Mandal coll.

*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.

1963. *Aphodius (Nialus) lividus*, Balthasar, *Mongr. Scarab. und Aphod. Palaeart. und Orient.*, 3 : 430-431.

*Material examined* : 1 ex. Agatti 13.4.1984. D. K. Mandal coll.

*Disrtibution* : The species is very widely distributed, almost cosmopolitan.

#### Family NITIDULIDAE

#### 6. *Macroura longipennis* (Mots.)

1859. *Carpophilus longipennis* Motschulsky, *E tud.ent.*, 7 : 40.

1908. *Macroura longipennis* : Grouvelle, *Ann. Soc. ent. Fr.*, 78 : 377 378.

*Material examined* : 4 exs. Agatti, 21.4.1984. D. K. Mandal coll.

#### Family SILVANIDAE

#### 7. *Oryzaephilus mercator* (Fauvel).

1889. *Silvanus mercator* Fauvel *Rev. d' ent. Caen* 8 : 132.

1911. *Oryzaephilus mercator* : Reitter, *Fauna Germanica* , 3 : 46.

*Material studied* : 1 ex. Kadamat. 11.4.1984 D. K. Mandal coll.

*Distribution* : Cosmopolitan, Africa, Asia, America, (North and South), Australia and Europe. In India the species is known from West Bengal, Bihar, Rajasthan and Maharashtra.

#### Family ANTHICIDAE

#### 8. *Notoxus* sp.

*Material examined* : 5 exs. Agatti, 30.3.1984; 2 exs. Kadam, 11.4.1984, D. K. Mondal coll.

*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 cineta* (F.)

1775. *Crioceris cineta* Fabricius, *Syst. Ent.*, 119.

1936. *Aulacophora cineta* : Maulik, *Fauna Brit. India*. Chrysomelidae (Galerucinae) 189 190.

*Material examined* : 1 ex. Agatti, 13.4.1984. D. K. Mandal coll.

*Distribution* : The species earlier known from South India (Nilgiri hills, Malabar) and Sri Lanka.

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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.



## MOLLUSCA

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### INTRODUCTION

In the beginning of this century an expedition was undertaken to Maldivian 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 woodboring 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 Virabhadra 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. <i>Chiton granoradiatus</i> Leloup                 | 2. * <i>C. maldivensis</i> (Smith) <sup>1</sup>       |
| 3. * <i>Schizochiton incisus</i> Sowerby <sup>1</sup> | 4. * <i>Squamopleura miles</i> Carpenter <sup>1</sup> |

Class GASTROPODA

Order ARCHAEOGASTROPODA

2. Family HALIOTIDAE

5. \*
- Haliotis (Ovinotis) ovina*
- (Gmelin)
- <sup>7,12</sup>

3. Family FISSURELLIDAE

- |   |  |
|---|--|
| 6. * <i>Diadora bombayana</i> Sowerby <sup>1</sup>    | 7. * <i>D. singaporensis</i> Reeve <sup>12</sup> |
| 8. * <i>Emarginula incisura</i> A. Adams <sup>1</sup> | 9. * <i>E. planulata</i> A. Adams <sup>1</sup>   |

4. Family TROCHIDAE

- |  |  |
|--|--|
| 10. * <i>Cantharidus maldivensis</i> (Smith) <sup>1</sup>              | 11. <i>Euchelus atratus</i> (Gmelin)                 |
| 12. * <i>Gibbula pulcherrima</i> (A. Adams) <sup>1,12</sup>            | 13. <i>Tectus (Tectus) pyramis</i> Born              |
| 14. * <i>Trochus (Infundibulum) radiatus</i><br>Gmelin <sup>1,12</sup> | 15. <i>T (I.) stellatus</i> Gmelin                   |
| 16. * <i>Trochus (Trochus) maculatus</i> <sup>1,7,12</sup><br>Linnaeus | 17. * <i>T (T.) incrassatus</i> Lamarck <sup>1</sup> |
| 18. * <i>T (T.) obesus</i> Reeve <sup>1</sup>                          |  |

5. Family STOMATELLIDAE

- 19.
- Stomatella (Gena) varia*
- (A. Adams)      20. \*
- S. (G.) auricula*
- Lamarck
- <sup>7</sup>

6. Family TURBINIDAE

- 21.
- Turbo (Marmarostoma) argyrostomus*
- 
- Linnaeus      22.
- Astraea (Astraliium) semicostata*
- 
- (Kiener)

7. Family NERITIDAE

- |  |   |
|--|---|
| 23. <i>Nerita (Thelisostyla) albicilla</i><br>Linnaeus | 24. <i>N. (Amphinerita) polita</i> Linnaeus |
| 25. <i>N. (Ritena) plicata</i> Linnaeus                | 26. <i>N. (R.) semirugosa</i> Recluz        |



56. \* *T corrugatus* Hinds<sup>1</sup>57. \* *T excellens* Smith<sup>1</sup>58. \* *T sculptus* Hinds<sup>1</sup>

## 15. Family JANTHINIDAE

59. \* *Janthina fragilis* Lamarck<sup>1,7</sup>

## 16. Family EULIMIDAE

60. *Balcis inflexa* (Pease)

## 17. Family CYPRAEIDAE

(All literature records by K.C.P.)

61. \* *Cypraea semiplota* (Mighels)62. *C. tigris* Linnaeus63. \* *Bistolida hirundo* (Linnaeus)64. \* *B. stolidia* (Linnaeus)65. \* *Blasicrura subteres* (Weinkauff)66. \* *Cribraria cribraria* (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*  
Schilder & Schilder74. \* *E. poraria* (Linnaeus)75. \* *Erronea caurica* (Linnaeus)76. \* *E. erronea* (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)<sup>1</sup>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 TRIVIIDAE

104. \* *Dolichupis (Cleotrivia) globosa cosmoi* (Dautzenberg)<sup>9</sup>

## 19. Family STROMBIDAE

105. *Strombus (Gibberulus) gibberulus*      106. *S. (Canarium) mutabilis* Swainson  
*gibberulus* Linnaeus  
 107. \* *S. dentatus* Linnaeus<sup>1</sup>      108. \* *S. lamarckii* Gray<sup>1</sup>  
 109. \* *S. lentiginosus* Linnaeus<sup>7</sup>      110. *Lambis (Lambis) lambis* (Linnaeus)  
 111. *L. (Harpago) chiragra chiragra*      112. \* *Terebellum terebellum* Linnaeus<sup>1</sup>  
 (Linnaeus)

## 20. Family VANIKORIDAE

113. *Vanikoro cancellata* (Lamarck)

## 21. Family HIPPONICIDAE

114. *Saptadanta nasika* Prashad & Rao

## 22. Family AMALTHEIDAE

115. \* *Cheilea porosa* (Reeve)<sup>7</sup>

## 23. Family NATICIDAE

116. *Natica (Natica) gualteriana* Recluz      117. *N. (N.) vitellus* Linnaeus  
 118. \* *N. euzona* Recluz<sup>1</sup>      119. \* *N. robillardi* Sowerby<sup>16</sup>  
 120. *Polinices maurus* Lamarck      121. *P. (Polinices) tumidus* (Swainson)  
 122. *P. (Mammilla) melanostomus* (Gmelin)

## 24. Family CASSIDAE

123. *Casmaria ponderosa ponderosa*      124. \* *Cassis cornuta* Linnaeus<sup>1</sup>  
 (Gmelin)  
 125. *Cypraecassis (C.) rufa* (Linnaeus)

## 25. Family TONNIDAE

126. *Malea pomum* Linnaeus      127. \* *Tonna costatum* Menke<sup>1</sup>  
 128. \* *T. olearium* Lamarck<sup>1,7</sup>      129. \* *T. perdix* (Linnaeus)<sup>1,7,10</sup>

## 26. Family CYMATIIDAE

- |  |   |
|--|---|
| 130. <i>Charonia (C.) tritonis</i> (Linnaeus)        | 131. <i>Cymatium parthenopeum</i> (von Salis)         |
| 132. <i>C. pileare</i> (Linnaeus)                    | 133. <i>C. nicobaricum</i> (Roeding)                  |
| 134. <i>C. (Ranularia) sinense</i> (Reeve)           | 135. <i>C. vespaceum</i> (Lamarck)                    |
| 136. * <i>C. tuberosum</i> Lamarck <sup>7</sup>      | 137. * <i>Triton lotorium</i> (Linnaeus) <sup>7</sup> |
| 138. * <i>T (Persona) anus</i> Linnaeus <sup>7</sup> |   |

## 27. Family FICIDAE

139. \* *Ficus ficus* (Linnaeus)<sup>1</sup>

## 28. Family BURSIDAE

- |  |   |
|--|---|
| 140. <i>Bursa bufonia</i> (Linnaeus)             | 141. * <i>B. bubo</i> (Linnaeus) <sup>7</sup> |
| 142. <i>B. cruentata</i> (Sowerby)               | 143. <i>B. granularis</i> (Roeding)           |
| 144. * <i>B. rubeta</i> (Linnaeus) <sup>10</sup> |   |

## Order NEOGASTROPODA

## 29. Family MURICIDAE

- |   |  |
|---|--|
| 145. <i>Chicoreus crocatus</i> (Reeve)                      | 146. * <i>C. ramosus</i> (Linnaeus) <sup>1</sup>                       |
| 147. * <i>Haustellum haustellum</i> (Linnaeus) <sup>1</sup> | 148. <i>Murex tribulus</i> Linnaeus                                    |
| 149. * <i>M. aculeatus</i> Lamarck <sup>1</sup>             | 150. * <i>M. pleurotomoides</i> Reeve <sup>1</sup>                     |
| 151. * <i>Pterynotus tripterus</i> (Born) <sup>1</sup>      | 152. <i>Maculotriton serriale</i> (Laborde)                            |
| 153. <i>Morula granulata</i> (Duclos)                       | 154. <i>M. anaxeres</i> (Kiener)                                       |
| 155. <i>M. uva</i> Roeding                                  | 156. <i>Drupa (Drupa) morum morum</i> Roeding                          |
| 157. <i>D. (D.) ricinus</i> Linnaeus                        | 158. <i>D. (Ricinella) rubusidaeus</i> Roeding                         |
| 159. <i>D. (Ricinella) clathrata miticula</i> Lamarck       | 160. <i>D. (Drupina) lobata</i> (Blainville)                           |
| 161. <i>Drupella cornus</i> (Roeding)                       | 162. <i>Cronia (Ergalatax) contracta</i> (Reeve)                       |
| 163. * <i>Muricanthus virgineus</i> (Roeding) <sup>1</sup>  | 164. * <i>Pterynotus albobrunneus</i> Bertsch & d'Attilio <sup>2</sup> |
| 165. * <i>Sistrum cavernosum</i> Reeve <sup>16</sup>        | 166. * <i>Nassa sarta</i> (Bruguiere) <sup>16</sup>                    |
| 167. * <i>Ricinula spectrum</i> Reeve <sup>7</sup>          | 168. <i>Rapana rapiformis</i> (Born)                                   |
| 169. <i>Purpura panama</i> (Roeding)                        | 170. <i>Thais armigera</i> (Link)                                      |
| 171. <i>T hippocastanum</i> (Linnaeus)                      | 172. <i>T intermedia</i> (Kiener)                                      |
| 173. <i>T tuberosa</i> (Roeding)                            |  |

## 30. Family CORALLIOPHILIDAE

174. \* *Coralliophila suturalis* A. Adams<sup>16</sup>    175. \* *C. madreporarium* Philippi<sup>7</sup>  
 176. *C. neritoidea* (Lamarck)    177. \* *Magilus ellipticus* Sowerby<sup>16</sup>  
 178. \* *M. cumingii* Deshayes<sup>16</sup>

## 31. Family PYRENIDAE

179. *Pyrene (Columbella) varians*    180. *P. (C.) turturina* Lamarck  
 (Sowerby)  
 181. \* *Columbella galaxias* Reeve<sup>16</sup>

## 32. Family BUCCINIDAE

182. *Cantharus (Polia) undosus* (Linnaeus)    183. *Engina lineata* (Reeve)  
 184. *E. mendicaria* (Linnaeus)    185. \* *E. rawsoni* Melvill<sup>1</sup>  
 186. \* *Phos roseatus* Hinds<sup>1</sup>    187. \* *P. textilis* A. Adams<sup>1</sup>

## 33. Family NASSARIIDAE

188. *Nassarius (Alectrion) papillosus*    189. *N. (Niotha) echinatus* (A. Adams)  
 (Linnaeus)  
 190. *Hebra horridus* (Dunker)    191. \* *Nassarius (Niotha) stigmarius*  
 (A. Adams)<sup>16</sup>  
 192. \* *N. (Plicarcularia) graniferous*    193. \* *N. maldivensis* (Smith)<sup>1</sup>  
 (Kiener)<sup>16</sup>  
 194. \* *N. disparalis* (Smith)<sup>16</sup>    195. \* *N. (Niotha) ecstilbus* (Melvill &  
 Standen)<sup>16</sup>  
 196. \* *Bullia tranquebarica* (Roeding)<sup>14</sup>

## 34. Family FASCIOLARIIDAE

197. *Peristernia nassatula* (Lamarck)    198. *Fasciolaria (Pleuroploca)*  
*filamentosa* (Roeding)  
 199. *Latirus belcheri* (Reeve)    200. *L. gibbulus* (Gmelin)  
 201. *L. smargdulus* (Linnaeus)    202. \* *L. craticulatus* Linnaeus<sup>7</sup>

## 35. Family OLIVIDAE

203. \* *Oliva erythrostoma* Lamarck<sup>1</sup>    204. \* *O. gibbosa* Born<sup>1</sup>



- |  |  |
|--|--|
| 235. <i>C. emaciatus</i> Reeve                               | 236. <i>C. geographus</i> Linnaeus                         |
| 237. <i>C. litteratus</i> Linnaeus                           | 238. <i>C. miliaris</i> Hwass in Bruguiere                 |
| 239. <i>C. miles</i> Linnaeus                                | 240. <i>C. musicus</i> Hwass in Bruguiere                  |
| 241. <i>C. rattus</i> Hwass in Bruguiere                     | 242. <i>C. tulipa</i> Linnaeus                             |
| 243. * <i>C. arenatus</i> Hwass in Bruguiere <sup>16</sup>   | 244. * <i>C. catus</i> Hwass in Bruguiere <sup>16</sup>    |
| 245. * <i>C. ceylonensis</i> Hwass in Bruguiere <sup>1</sup> | 246. * <i>C. distans</i> Hwass in Bruguiere <sup>1</sup>   |
| 247. * <i>C. eburneus</i> Hwass in Bruguiere <sup>1,16</sup> | 248. * <i>C. flavidus</i> Lamarck <sup>16</sup>            |
| 249. * <i>C. herbeus</i> Linnaeus <sup>1,7</sup>             | 250. * <i>C. tessellatus</i> Born <sup>7</sup>             |
| 251. * <i>C. nussatella</i> Linnaeus <sup>7</sup>            | 252. * <i>C. zonatus</i> Hwass in Bruguiere <sup>1,7</sup> |
| 253. * <i>C. monachus</i> Linnaeus <sup>7</sup>              | 254. <i>C. virgo</i> Linnaeus                              |
| 255. * <i>C. lineatus</i> Chemnitz <sup>1</sup>              |  |

44. Family TEREBRIDAE

- |   |  |
|---|--|
| 256. <i>Terebra maculata</i> (Linnaeus)         | 257. <i>T. felina</i> (Dillwyn)                              |
| 258. <i>T. affinis</i> Gray                     | 259. * <i>T. crenulata</i> Linnaeus <sup>7,16</sup>          |
| 260. * <i>T. dimidata</i> Linnaeus <sup>1</sup> | 261. * <i>T. cingulifera</i> Lamarck <sup>1</sup>            |
| 262. * <i>T. oculata</i> Lamarck <sup>1</sup>   | 263. * <i>T. (Hastula) lanceolata</i> Linnaeus <sup>16</sup> |
| 264. * <i>T. duplicata</i> Reeve <sup>7</sup>   |  |

Order ENTOMOTAENIATA

45. Family PYRAMIDELLIDAE

- |   |  |
|---|--|
| 265. <i>Pyramidella sulcata</i> (A. Adams)                | 266. * <i>P. corrugata</i> Lamarck <sup>1,16</sup> |
| 267. * <i>Obeliscus dolabratus</i> Linnaeus <sup>16</sup> |  |

Order CEPHALASPIDEA

46. Family ACTEONIDAE

- |   |   |
|---|---|
| 268. <i>Pupa solidula</i> (Linnaeus)            | 269. * <i>P. nitidula</i> (Lamarck) <sup>16</sup> |
| 270. * <i>P. glabrata</i> (Reeve) <sup>16</sup> | 271. * <i>P. tessellata</i> (Reeve) <sup>16</sup> |

47. Family PHILINIDAE

272. \* *Cryptophthalmus minikoiensis* Smith<sup>1</sup>

48. Family ACERIDAE

273. \* *Volvatella cincta* Nevill<sup>16</sup>

## 49. Family BULLIDAE

274. \* *Bulla ampulla* Linnaeus<sup>1,16</sup>275. \* *B. vernicosa* Gould<sup>7</sup>

## 50. Family ATYIDAE

276. \* *Atys cylindrica* Helbling<sup>16</sup>277. \* *A. naucum* Linnaeus<sup>7,16</sup>278. \* *A. succisa* Ehrenberg<sup>16</sup>

## 51. Family CAVOLINIDAE

279. \* *Creseis bulgia* Sakthivel<sup>15</sup>

## Order BASOMMATOPHORA

## 52. Family SIPHONARIIDAE

280. *Siphonaria funiculata* Reeve

## 53. Family ELLOBIIDAE

281. \* *Melampus fasciatus* Deshayes<sup>7</sup>

## 54. Family PLANORBIDAE

282. *Indoplanorbis exustus* (Deshayes)

## 55. Family SUCCINEIDAE

283. \* *Succinea vitrea* Pfeiffer<sup>16</sup>

## 56. Family ENIDAE

284. *Rhachis punctatus* (Anton)

## 57. Family SUBULINIDAE

285. *Lamellaxis gracile* (Hutton)

## 58. Family ARIOPHANTIDAE

286. \* *Sitala vagata* Smith<sup>16</sup>

## Order ANASPIDEA

## 59. Family APLYSIIDAE

287. *Aplysia (Varria) cornigera* Sowerby288. *Dolabella ecaudata* Rang

## Order SJACCOGLOSSA

## 60. Family OXYNOIDAE

289. \*
- Oxynoe delicatula*
- Nevill
- <sup>16</sup>

## Order NUDIBRANCHIA

## 61. Family HEXABRANCHIDAE

290. \*
- Hexabranhus digitatus*
- Eliot
- <sup>1,5</sup>

## 62. Family DORIDIDAE

291. \* *Chromodoris elizabethina* Bergh<sup>5</sup>      292. \* *C. pustulans* Bergh<sup>5</sup>  
 293. \* *Glossodoris festiva* (Adams)<sup>10</sup>      294. \* *Discodoris concinna* (Alder & Hancock)<sup>1,5</sup>  
 295. \* *D. pardalis* (Alder & Hancock)<sup>1,5</sup>      296. \* *Asteronotus caespitosus* (van Hasselt)<sup>11</sup>  
 297. \* *Trippa ornata* Bergh<sup>1,5</sup>

## 63. Family NOTODORIDIDAE

298. \*
- Notodoris gardineri*
- Eliot
- <sup>5</sup>

## 64. Family DENDRODORIDIDAE

299. \*
- Dendrodoris nigra*
- Stimpson
- <sup>1</sup>

## 65. Family PHYLLIDIIDAE

300. \*
- Phyllidia (Phyllidia) varicosa*
- Lamarck
- <sup>11</sup>
301. \*
- P. (Phyllidella) zelanica*
- Kelaart
- <sup>11</sup>

## 66. Family PLEUROPHYLLIDIDAE

302. \*
- Pleurophyllidia gracilis*
- Bergh
- <sup>1,5</sup>

## 67. Family DOTONIDAE

303. \*
- Doto indica*
- Bergh
- <sup>1,5</sup>

## 68. Family PLEUROBRANCHIDAE

304. \*
- Cyerce nigra*
- Bergh
- <sup>5</sup>

## 69. Family HERMAEIDAE

305. \*
- Hermaea minor*
- Bergh
- <sup>5</sup>

## 70. Family GLAUCIDAE

306. \* *Glaucus* sp.<sup>1</sup>

## Order SOLEOLIFERA

## 71. Family ONCHIDIDAE

307. *Onchidium verruculatum*, Cuvier

## Class BIVALVIA

## Order ARCOIDA

## 72. Family ARCIDAE

308. *Arca avellana* Lamarck<sup>1</sup>309. \* *A. symmetrica* Reeve<sup>1,16</sup>310. \* *Barbatia helblingi* (Bruguiere)311. \* *B. tenella* (Reeve)<sup>1,16</sup>312. *B. amygdalumtostum* Roeding313. *Acar plicata* (Dillwyn)

## 73. Family NOETIIDAE

314. \* *Striarca lactea* (Linnaeus)<sup>1</sup>

## Order LIMOPSACEA

## 74. Family Limopsidae

314. \* *Limpsis indica* Smith<sup>16</sup>

## Order MYTILOIDA

## 75. Family MYTILIDAE

316. *Modiolus philippinarum* Hanley317. \* *M. arborescens* Chemnitz<sup>1</sup>318. \* *M. flavida* Dunker<sup>1</sup>319. \* *Modiolaria argentea* Reeve<sup>1</sup>320. \* *Botula cinnamomea* (Lamarck)<sup>1</sup>321. \* *Lithophaga teres* (Philippi)<sup>1</sup>322. \* *L. nigra* Orbigny<sup>1</sup>

## 76. Family PINNIDAE

323. \* *Pinna muricata* Linnaeus<sup>1</sup>324. \* *P. saccata* Linnaeus<sup>1</sup>325. \* *P. serrata* Solander<sup>1</sup>326. \* *P. cebuensis* Reeve<sup>7</sup>327. \* *Atrina vexillum* (Born)<sup>1</sup>

## Order PTERIOIDA

## 77. Family PTERIIDAE

328. \* *Margaritifera vulgaris* Schumacher<sup>7</sup>329. *Pinctada fucata* (Gould)

78. Family ISOGNOMONIDAE

330. \* *Malleus anadinus* Gmelin<sup>1</sup>                      331. \* *Electroma alacorvis* Chemnitz<sup>16</sup>

78. Family PECTINIDAE

332. \* *Pecten irregularis* Sowerby<sup>1</sup>                      333. \* *P. senatorius* Gmelin<sup>1</sup>  
 334. \* *P. maldivensis* Smith<sup>1</sup>                              335. \* *P. varians* Linnaeus<sup>1</sup>  
 336. \* *Pallium plica* Linnaeus<sup>1</sup>                              337. \* *Semipecten forbesianus* Adams & Reeve<sup>1</sup>

80. Family SPONDYLIDAE

338. *Spondylus layardi* Reeve                              339. *S. multisetosus* Reeve  
 340. \* *S. imperialis* Chenu<sup>1</sup>                                  341. \* *S. violacens* Lamarck<sup>7</sup>

81. Family LIMIDAE

342. \* *Lima fragilis* Chemnitz<sup>1,16</sup>                              343. \* *L. inflata* Chemnitz<sup>1</sup>  
 344. \* *L. squamosa* Lamarck<sup>1</sup>

82. Family OSTREIDAE

345. *Crassostrea rivularis* (Gould)                              346. *Crassostrea* sp.  
 347. *Saccostrea cucullata* (Born)

Order VENEROIDA

83. Family LUCINIDAE

348. *Codakia punctata* (Linnaeus)                              349. *Ctena bella* (Conrad)

84. Family CHAMIDAE

350. *Chama (Chama) isotoma* Conrad                              351. *C. multisquamosa* Reeve  
 352. \* *C. imbricata* Broderip<sup>1</sup>

85. Family CARDITIDAE

352. *Cardita variegata* (Bruguiere)                              353. \* *C. rufescens* Lamarck<sup>7</sup>

86. Family CARDIIDAE

355. *Ctenocardia fornucata* (Sowerby)                              356. \* *Cardium leucostoma* Born<sup>1,7</sup>  
 357. \* *C. fragum* Linnaeus<sup>7</sup>                                      358. \* *C. sueziense* Issel<sup>16</sup>  
 359. \* *C. (Laevicardium) australe* Sowerby<sup>1,16</sup>                              360. \* *C. (L) lobulatum* Deshayes<sup>1</sup>

## 87. Family TRIDACNIDAE

361. *Tridacna (Chamotrachea) maxima* (Roeding)

## 88. Family MACTRIDAE

362. *Maetra luzonica* Deshayes363. \* *M. olorina* Philippi<sup>7</sup>

## 89. Family MESODESMATIDAE

364. *Atactodea glabrata* (Gmelin)

## 90. Family CULTELLIDAE

365. \* *Siliqua grandis* Dunker<sup>10</sup>

## 91. Family DONACIDAE

366. *Donax faba* Shchroeter

## 92. Family TELLINIDAE

367. *Tellina (Quidnipagus) palatum* Iredale368. *T (Scutarcopagia) scobianata*

Linnaeus

369. *T (Arcopagia) remies* Linnaeus370. *T (Arcopaginula) inflata* Gmelin371. \* *T elegans* Gray<sup>1,7</sup>372. \* *T rastellum* Hanley<sup>16</sup>373. \* *T rhomboides* Quoy & Gaimard<sup>1,16</sup>374. \* *T robusta* Born<sup>16</sup>375. \* *T rugosa* Born<sup>1</sup>376. \* *T verrucosa* Hanley<sup>1</sup>377. \* *T virgata* Linnaeus<sup>7</sup>378. *Macoma (Scissulina) reticulata*  
(Sowerby)

## 93. Family PSAMMOBIIDAE

379. \* *Psammobia rugulosa* Adams &  
Reeve<sup>1</sup>380. \* *Asaphis deflorata* Linnaeus<sup>7</sup>381. *A. violascens* (Förskal)

## 94. Family TRAPEZIIDAE

382. \* *Cypraecardia guiniana* Lamarck<sup>7</sup>

## 95. Family VENERIDAE

383. *Gafrarium pectinatum* (Linnaeus)384. *Marcia pinguis* (Schroester)385. *Timoclea scabra* (Haney)386. \* *Venus reticulata* Linnaeus<sup>1,7</sup>387. \* *V. marica* Linnaeus<sup>16</sup>388. \* *V. toreuma* Gould<sup>1,7</sup>



## Order TEUTHOIDEA

## 103. Family OMMASTREPHIDAE

419. \* *Symplectoteuthis oualaniensis* (Lesson)<sup>1</sup>

## 104. Family ENOPLOTEUTHIDAE

420. \* *Abralia andamanica* Goodrich<sup>17</sup>      421. \* *Abraliopsis gilchristi* (Robson)<sup>17</sup>

## Order OCTOPODA

## 105. Family OCTOPODIDAE

422. \* *Octopus (O) arborescens* (Hoyle)<sup>1</sup>      423. \* *O. (O.) gardineri* (Hoyle)424. \* *D. (O.) horridus* (d'Orbigny)<sup>1</sup>      425. \* *O. marmoratus* (Hoyle)

## EXPLANATIONS FOR SYMBOLS

<sup>1</sup> Nagabhushanam A.K. & Chandrasekhara Rao, G. 1972;<sup>2</sup> Bertsch, H. & d'Attilio, A. 1980;<sup>3</sup> B.P. Halder;<sup>4</sup> D.R.K. Sastry;<sup>5</sup> Eliot, C. 1906;<sup>6</sup> G. Chandrasekhara Rao;<sup>7</sup> Hornell, J, 1921;<sup>8</sup> Hoyle, W.E. 1906;<sup>9</sup> Panicker, K.C.S. 1977-78;<sup>10</sup> Sundaram, K.S. 1969;<sup>11</sup> Virabhadra Rao, K. *et al.* 1975;<sup>12</sup> Melvill, J.C. 1909;<sup>13</sup> Nair, N.B., & Dharmaraja, K. 1986;<sup>14</sup> Namboodiri, P.N. & Sivadas, P. 1980;<sup>15</sup> Sakthivel, M. 1974;<sup>16</sup> Smith, E.A. 1903, 1906;

## ABBREVIATIONS USED

Coll.                               : Collector;

Ex./Exs.                         : Example/Examples;

Fig./Figs.	:	Figure/Figures;
Fms.	:	Fathomes;
Ht.	:	Height;
L.	:	Length;
L.A.	:	Length of aperture;
L.C.	:	Length of Canal;
L.S.	:	Length of spire;
M.	:	Metre;
S.D.	:	Subsequent designation;
W.	:	Width;
T.	:	Thickness.;

All measurements are given in millimeters.

### SYSTEMATIC ACCOUNT

Class POLYPLACOPHORA

Family I CHITONIDAE

Genus 1. *Chiton* Linnaeus, 1758

#### 1. *Chiton granoradiatus* Leloup

1937. *Chiton granoradiatus* Leloup, *Bull. Mus.r.nat. Belg.* Brussels, 13 (38) : 2 (Type locality : Andamans, India).  
 1976. *Chiton granoradiatus* : Rajagopal and Subba Rao, *J.mar. biol. Ass. India*, 16 (2) (1974) : 405.

*Material* : Kavaratti: 1 ex., Coll. D.R.K.S., 5.2.1986

*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, 18472. ***Euchelus atratus*** (Gmelin)

1791. *Turbo atratus* Gmelin, *Syst. Nat.*, ed. 13 : 3061, sp. no. 53 (Type locality : Nicobar Island).

1978. *Euchelus atratus* : Rajagopal and Mookherjee, *Rec. zool. Surv. India Occ. Paper* 12 : 20.

**Material** : Minicoy: 9 exs., Coll. D.R.K.S., 14 & 15.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Pamban, Andaman and Nicobar Islands. *Elsewhere* : Singapore, Indonesia, Fiji, Philippines.

The species is recorded for the first time from these Islands.

Genus 3. **Tectus** Montfort, 18103. ***Tectus pyramis*** (Born)

1778. *Trochus pyramis* Born, *Index Rerum Musei Caesarei Vindobonensis* : 333.

1972. *Tectus pyramis* : Cemohorsky, *Marine shells of the Pacific*, 2 : 39, pl. 8, fig. 4.

**Material** : Kavaratti: 1 ex., Coll. D.R.K.S., 6.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

The species is recorded for the first time from these Islands..

## Subfamily TROCHINAE

Genus 4. **Trochus** Linnaeus, 1758.Subgenus **Infundibulum** Montfort, 18104. ***Trochus (Infundibulum) stellatus*** Gmelin

1791. *Trochus stellatus* Gmelin, *Syst. Nat.*, ed. 13, : 3571, sp. no. 26 (Type locality : India)

1978. *Trochus (Infundibulum) stellatus* : Rajagopal and Mookherjee, *Rec. zool. Surv. India, Occ. Paper.*, 12 : 26.

**Material** : Kavaratti : 5 exs., Coll. B.P.H.; 5. & 11.4.1984. 1 ex., Coll. D.R.K.S., 8.2.1986; Minicoy : 1 ex. Coll. B.P.H., 10.12.1979; 1 ex., Coll. D.R.K.S., 15..2.1986.

**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.

Distribution : *India* : Lakshadweep, Andaman and Nicobar Islands, Gulf of Mannar, Tuticorin, Mandapam and Capecomorin. *Elsewhere* : Maldives and Seychelles.

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)

1850. *Gena varia* Adams, *Proc. zool. Soc. Lond.*, 1850 : 37.

1982. *Stomatella (Gena) varia* : Abbott and Dance, *Campendium of Sea shells* : 44, fig.

*Material* : Kavaratti; 1 ex., Coll. D.R.K.S., 4.2.1986.

*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 (Cernohorsky, 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.

*Distribution* : *India* : Lakshadweep only. *Elsewhere* : Sri Lanka, Mauritius, Red sea, Taihati, Japan to S.W. Pacific.

Family IV TURBINIDAE

Genus 6. *Turbo* Linnaeus, 1758

Subgenus *Marmarostoma* Swaison, 1829

6. *Turbo (Marmarostoma) argyrostomus* Linnaeus

1758. *Turbo argyrostomus* Linnaeus, *Syst. Nat.*, ed. 10 : 764, sp. no. 544 (Type locality : 'M. Indico').

1906. *Turbo (Senectus) argyrostoma* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, pt. 2 : 617.

1909. *Turbo (Senectus) argyrostoma* : Melvill, *Trans. Linn. Soc. Lond.*, (2) 13 : 81

*Material* : Kavaratti : 2 exs., Coll. B.P.H. 1984; 5 exs. Coll. D.R.K.S., 5-7.2.1986; Agatti: 1 ex., Coll. B.P.H., 4.4.1984; Androth: 1 ex., Coll. G.C.R., 22.2.1983.

*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).

*Distribution* : India : Lakshadweep, Andaman and Nicobar Islands. Common in Indo-Pacific.

Genus 7. *Astraea* Roeding, 1798

Subgenus *Astrelium* Link, 1807

7. *Astraea (Astralium) semicostata* (Kiener)

1839. *Trochus semicostatus* Kiener, *Icon. Coq. Viv.*, *Trochus* pl. 38, fig. 1 (Type locality : Not known).

1978. *Astrea (Astralium) semicostatus* : Rajagopal and Mookherjee. *Rec. zool. Surv. India Occ. Paper*, 12 : 32.

*Material* : Kavaratti: 1 ex., Coll. G.C.R., 6.8.1983; Androth: 1 ex., Coll. G.C.R., 22.2.1983.

*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

8. *Nerita (Theliostyla) albicilla* Linnaeus

1758. *Nerita albicilla* Linnaeus, *Syst. Nat.*, ed. 10 : 778 sp. 640 (Type locality : 'Ad Hitoe').

1906. *Nerita albicilla* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes* pt. 2 : 617.

1978. *Nerita (Theliostyla) albicilla* : Ragopal and Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 12 : 39.

*Material* : Kavaratti: 18 exs., Coll. B.P.H., 27.3.1984 & 6.4.1984; 2 exs. Coll. B.P.H., 4-11.4.1984; Minicoy: 14 exs., Coll. G.C.R., 15.3.1983; 9 exs. Coll. D.R.K.S., 15.2.1986; South end of Kalpeni and Pitti; 1 ex., Coll. D.R.K.S. 22.2.1986.

*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

1758. *Nerita polita* Linnaeus, *Syst. Nat.*, ed. 10 : 778, sp. 638 (Typelocality : 'O. Asiae').  
 1906. *Nerita polita* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, pt. 2 : 617.  
 1978. *Nerita (Amphinerita) polita* : Rajagopal and Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 12 : 41.

**Material** : Kavaratti: 1 ex., Coll. B.P.H., 27.3.1984; Agatti: 1 ex., Coll. B.P.H., 6.4.1984; Minicoy: 1 ex., B.P.H. 10.12.1979; 49 exs. Coll. G.C.R., 15.3.1983; 5 ex., Coll. D.R.K.S., 17-19.2.1986; South end of Kalpeni and Pitti: 1 ex., Coll. D.R.K.S., 22.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Krusadai id., Pulli id., Tuticorin, Madras, Porto Novo, Visakhapatnam and Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in Indo-Pacific.

Subgenus **Ritena** Gray, 1858

10. *Nerita (Ritena) plicata* Linnaeus

1758. *Nerita plicata* Linnaeus, *Syst. Nat.*, ed. 10 : 779, sp. 642 (Type locality : Not mentioned).  
 1906. *Nerita plicata* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, pt. 2 : 617.  
 1975. *Nerita (Ritena) plicata* : Subba Rao, *Studies on Indian Neritids*, Ph. D. Thesis, Calcutta Univ.: 83, pl. 35, fig. 7

**Material** : Minicoy: 7 exs., Coll. D.R.K.S., 15-17.2.1986; 29 exs., Coll. G.C.R., 15.3.1983; Kalpeni: 6 exs., Coll. D.R.K.S., 22.2.1986; Kavaratti: 8 exs., Coll. D.R.K.S.

**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.

**Distribution** : *India* : Lakshadweep; Palk Bay, Gulf of Mannar, Madras, Tranquebar. *Elsewhere* : Maldives, South Africa, Zanzibar, Malagasy; Mauritius, Sri Lanka, Indonesia, Australia. Widely distributed in Indo-Pacific waters.

11. *Nerita (Ritena) semirugosa* Recluz

1841. *Nerita semirugosa* Recluz, *Revue Zool. Soc. Cuvier* : 102 (Type locality : Timor) 103, (refers Chemnitz figs. 1960, 1961).

1975. *Nerita (Ritena) semirugosa* : Subba Rao, *Studies on Indian Neritids*, Ph. D. Thesis, Calcutta Univ.: 97, pl. 12, figs. 1-5; pl. 19, figs. 1.

**Material** : Minicoy, Viringili: 2 exs., Coll. D.R.K.S., 17.2.1986.

**Measuremet** : 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).

**Distribution** : *India* : Lakshadweep, Appa Island, Krusadai Island, Gulf of Mannar, Andaman and Nicobar Islands. *Elsewhere* : Malagasay (Madagascar), Mauritius, Maldives, Singapore, Indonesia, Philippines, Australia.

12. *Nerita (Theliosstyla) squamulata* Le Guillou

1841. *Nerita squamulata* Le Guillou, *Revue Zool. Soc. Cuvier* : 344 (Type locality : Not given).

1972. *Nerita (Theliosstyla) squamulata* : Cernohorsky, *Marine shells of the Pacific*, 2 : 50, pl. 11, fig. 6-6a.

**Material** : Near light house, Minicoy: 1 ex., Coll. G.C.R. 10.3.1983.

**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.

Genus 9. *Pseudonerita* Baker, 192313. *Pseudonerita amoena* (Gould)

1847. *Nerita amoena* Gould, *Proc. Bost. Soc. nat. Hist.*, 2 : 238 (Type locality : not mentioned).

1975. *Pseudonerita amoena* : Subba Rao, *Studies on Indian Neritids*, Ph.D. Thesis, Calcutta Univ. : 210, pl.29 figs. 1-3; pl. 36, fig. 8.

**Material** : Minicoy Island: 1 ex., Coll. G.C.R. 15.8.1983.

**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

1839. *Littorina undulata* Gray, *The Zoology of Captain Beechey's Voyage in H.M.S. Blossom, Mollusks* : 140 (Type locality : Okinawa, Ryukyu Islands subsequent designation, Rosewater, 1970).  
 1906. *Littorina undulata* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, pt. 2 : 615.  
 1982. *Littorina (Littoraria) undulata* : Rajagopal and Mookherjee *Rec. zool. Surv. India Occ. Paper*, 28 : 6.

*Material* : Minicoy: 1 ex., Coll. G.C.R., 13.3.1983; Kavaratti: 33 exs., Coll. B.P.H., 30.3.1984; 11 exs., Coll. D.R.K.S., 9.2.86, 1 ex., Coll. D.R.K.S., 15.2.1986.

*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.

*Distribution* : India : Lakshadweep. Commonly found on east and west coasts of India and Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in Indo-Pacific (Rosewater, 1970).

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)

1851. *Trochus tantillus* Gould, *Proc. Boston Soc. nat. Hist.*, 3 : 118; 1852, *Mollusca and Shells*, 12 : 184, fig. 215 (Type locality : Sandwich island).  
 1931. *Peasiella tantilla* : Thiele, *Handbuch der Systematischen Weichtierkunde* : 126.

*Material* : Lakshadweep: 8 exs., Coll. no. data.

*Measurements* : L. 2.28 - 3.05; W. 1.42 - 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)

1774. *Nerita tuberculata* Mueller, *Verm. Terr. Fluv. Hist.*, 2 : 191 (Type locality : Coromandel coast).

1979. *Melanoides tuberculatus* : Subba Rao and Mitra, *Rec. zool. Surv. India*, 75 : 23.

*Material* : Minicoy: 1 ex., Coll. G.C.R., 13.3.1983; Freshwater pond in Agricultural garden Kavaratti: 13 exs., Coll. D.R.K.S., 6.2.1986.

*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).

1987. *Planaxis sulcatus* : Houbbrick, *Smithsonian Contributions to zoology*, No. 445 : 5 figs. 1-4.

*Material* : South end Kalpeni and Pitti: 45 exs., Coll. D.R.K.S. 22.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Krusadai Island, Shingle Island, Rameswaram, Tuticorin, Madras, Visakhapatnam, Andaman and Nicobar Islands. *Elsewhere* : Gulf of Suez, Mauritius, South Africa, Sri Lanka, Burma, Indonesia, Singapore, Philippines and Australia.

Genus 14 *Angiola* Dall, 192618. *Angiola lineata* (da Costa)

(Plate I, figs. 1&amp;2)

1778. *Buccinum lineatum* da Costa, *British Conchology* : 130 (Type locality : West Indies).1987. *Angiola lineata* Houbriek, *Smithsonian Contributions to Zoology*, no. 445 : 20, figs. 14-16.

*Material* : Kavaratti: 43 exs. coll. B.P.H. 27-30. 3. 1984; Kadmat: 15 exs., Coll. B.P.H., 11.4.1984; 18 exs. no data; South end Kalpeni and Pitti 2 exs., Coll. D.R.K.S., 22.2.1986.

*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. Houbriek (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, 183819. *Modulus tectum* (Gmelin)1791. *Trochus tectum* Gmelin, *Syst. Nat.* ed, 13 : 3569, sp. 16 (Type locality : Not given).1921. *Modulus tectum* var. *candida* Hornell, *Madras Fish. Bull.* 14 (6) : 213.1972. *Modulus tectum* : Cernohorsky, *Marine shells of the Pacific*, 2 : 60 pl. 12 fig. 22.

*Material* : Minicoy: 1 ex., Coll. G.C.R. 13.3.1983; 1 ex., Coll. D.R.K.S. 9.2.1986.

*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, 184020. *Terebralia palustris* (Linnaeus)

1767. *Strombus palustris* Linnaeus, *Syst. Nat.*, ed. 12 : 1213. (Type locality : "India").

1972. *Terebralia palustris* : Cernohorsky, *Marine shells of the Pacific*, 2 : 61, pl. 13, fig. 5.

*Material* : Minicoy: 3 exs., Coll. D.R.K.S., 19.2.1986.

*Measurements* : L. 62.80 - 65.10; W. 24.40 - 24.85

*Distribution* : India : Lakshadweep, Mahanadi estuary, back waters near Gopalpur, Godavary estuary, Krishna estuary, Kundugal point, Krusadai Island, Andaman and Nicobar Islands. *Elsewhere* : Widely distributed throughout tropical Pacific (Cernohorsky, 1972).

## Family XI CERITHIIDAE

The material includes four species under three genera viz. *Cerithium*, *Clypeomorus* and *Rhinoclavis*.

Genus 17. *Cerithium* Bruguiere, 178921. *Cerithium columna* Sowerby

1834. *Cerithium columna* Sowerby, *Genera of Recent and Fossil shells* :, pt. 42, pl. 213, fig. 7 (Type locality : not given).

1906. *Cerithium columna* : Smith, In : *Gardiner's Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 614.

1982. *Cerithium columna* : Rajagopal and Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 28 : 34.

*Material* : Kavaratti: 3 exs., Coll. B.P.H., 27-30.3.1984. Minicoy: 1 ex, Coll. G.C.R., 11.3.1983.

*Measurements* : L. 23.32 - 37.42; W. 12.40 - 15.86

*Remarks* : It is common on rocky beaches and in coral reefs.

*Distribution* : India : Lakshadweep, Krusadai Island, Mandapam, Palk Bay, Keelakkarai, Tuticorin, Andamans. *Elsewhere* : Red sea, Mozambique, Mauritius, Maldives, Sri Lanka, Indonesia, Polynesia, Australia.

22. *Cerithium nodulosum* Bruguiere

1792. *Cerithium nodulosum* Bruguiere, *Encyclopedie Methodique* Paris., 1 (2): 478, sp.8, (Type locality: Not given)

1921. *Cerithium nodulosum* : Hornell, *Bull. Madras Fish.*, 14 (6) : 213.

1979. *Cerithium nodulosum* : Mallik, *Marine Geology*, 29 : 375, fig. 25.

*Material* : Kavaratti: 1 ex., Coll. B.P.H., 5.4.1984.

*Measurements* : L. 32.70; W. 15.20

*Remarks* : Animals usually found on reef flats or sand bars (Cernohorsky, 1972). Anatomy, reproduction and early development have been studied by Houbriek (1971).

*Distribution* : India : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

Genus 18 *Clypeomorus* Jousseaume, 188823. *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).
1966. *Clypeorus batillariaeformis* Habe and Kosuge, *Venus*, 24 (4) : 328, pl. 29, fig. 13 (Type locality : Arafura sea, Northern Territory, Australia).
1985. *Clypeorus batillariaeformis* : Houbrick, *Smithsonian Contributions to zoology*, No. 403: 51, figs. 23-27 (for other synonyms).

*Materials* : Kavaratti: 2 exs., Coll., B.P.H., 30.3.1984; Minicoy: 13 exs., Coll. G.C.R., 11&15.3.1983; Agatti: 2 exs., Coll. B.P.H., 4.4.1984.

*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

1855. *Cerithium traillii* Sowerby, *Thesaurus Conchyliorum*, 2 (16) : 871, pl. 182, pl. 182, figs. 173, 174.
1972. *Clypeomorus traillii* : Cernohorsky, *Marine shells of the Pacific*, 2 : 71, pl. 16, fig. 10.

*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, 1840Subgenus *Rhinoclavis* s. str.25. *Rhinoclavis (Rhinoclavis) sinensis* (Gmelin)

1791. *Murex sinensis* Gmelin, *Syst. Nat.*, ed. 13 (1) : 3542, sp. 54 (Type locality: "In mari Senegaliæ allunate").
1906. *Vertagus obeliscus* var. *cedonilli* : Smith, In : *Gardiner's Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 614.
1982. *Rhinoclavis (Rhinoclavis) sinensis* : Rajagopal and Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 28 : 33.

*Material* : Kavaratti: 1 ex., Coll. B.P.H., 29.3.1984; 11 exs., Coll. D.R.K.S., 5-8.2.1986; Kadmat: 1 ex., Coll. B.P.H., 11.4.84; south end Kalpeni and Pitti: 1 ex., Coll. D.R.K.S., 22.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Bombay, Okha, Goa, Kanyakumari, Krusadai Island, Pamban, Mandapam Visakhapatnam, Andamans, *Elsewhere* : Widely distributed in Indo-Pacific.

## Family XII TRIPHORIDAE

The family includes small minute sinistral shells usually sculptured with beaded ridges. Two species are included here.

### Genus 20. *Triphoris* Blainville, 1828

Two species are recorded from these Islands.

#### 26. *Triphoris elegans* Hinds

1843. *Triphoris elegans* Hinds, *Ann. Mag. nat. Hist.*, 11 : 18 (Type locality : Straits of Malacca, 20 fms.).

1906. *Triphor elegans* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 613.

*Material* : Kavaratti: 1 ex., Coll. D.R.K.S., 5.2.1986.

*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

1860. *Triphoris cingulifera* Pease, *Proc. zool. Soc. Lond.* (1860) : 434 (Type locality : Sandwich islands).

*Material* : Kavaratti: 1 ex., Coll. B.P.H., 29.3.1984.

*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)

1868. *Eulima inflexa* Pease, *Am. J. Conch.*, 3 : 294, pl. 24 fig. 26.

*Material* : Kavaratti; 1 ex., Coll. D.R.K.S., 5.2.1986.

*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

1758. *Cypraea tigris* Linnaeus, *Syst. Nat.*, ed. 10 : 721, sp. 302 (Type locality : Madagascar).

1967. *Cypraea tigris* : Cernohorsky, *Marine shells of the Pacific*, 1 : 64, pl. 8, fig. 31.

1979. *Cypraea tigris tigris* : Mallik, *Marine Geology*, 29 : 375, fig. 29A.

*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 dilated.

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)

1958. *Cypraea caputserpentis* Linnaeus, *Syst. Nat.*, ed. 10 : 720, sp. 298 (Type locality : 'Mauritio').  
 1906. *Cypraea caputserpentis* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 611.  
 1985. *Erosaria caputserpentis* : Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 75 : 33, pl. 4, figs, 19a, b.

*Material* : Kavaratti: 2 exs., Coll. B.P.H., 1984; 1 ex., Coll. D.R.K.S., 9.2.1986.

*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 Cheriya as *E. caputserpentis reticulum* (Gmelin) may probably belong to the present species.

*Distribution* : *India* - Lakshadweep, Visakhapatnam, Madras, Krusadai Island, Pamban, Rameswaram and Andaman and Nicobar Islands. *Elsewhere* : Throughout Indo-Pacific region.

#### 31. *Erosaria erosa* (Linnaeus)

1758. *Cypraea erosa* Linnaeus, *Syst. Nat.*, ed. 10 : 723, sp. 315 (Type locality : "in Mauritio & Insula Adsoensionis").  
 1906. *Cypraea erosa* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 612.  
 1967. *Erosaria erosa* : Cernohorsky, *Marine shells of the Pacific*, 1 : 80, pl. 12, fig. 61.

*Material* : Kavaratti: 2 exs., Coll. D.R.K.S., 8-9.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 19.2.1986.

*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*.

*Distribution* : *India* - Lakshadweep, Pamban, Krusadai Island, Shingle Island, Andaman and Nicobar Islands. *Elsewhere* : From East Africa to Polynesia, Hawaii (Cernohorsky, 1967).

Genus 24 *Erronea* Troschel, 186332. *Erronea listeri* (Gray)

1825. *Cypraea listeri* Gray, *Zool. Journ.*, 1 (4) : 507 (Type locality : Philippines).  
 1906. *Cypraea felina* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 612.  
 1967. *Erronea listeri* : Cernohorsky, *Marine shells of the Pacific*, 1 : 87, pl. 15, fig. 77.

*Material* : Kavaratti: 5 exs., Coll. D.R.K.S. 7-9.2.1986.

*Measurements* : L. 15.32 - 17.80; W. 8.30 - 9.45

*Remarks* : Shell small agreeing with the description and figure given by Cernohorsky (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* Jousseume, 188433. *Luria isabella* (Linnaeus)

1758. *Cypraea isabella* Linnaeus, *Syst. Nat.*, ed. 10 : 722, sp. 304 (Type locality : 'Mauritius, Madagascar').  
 1967. *Luria isabella* : Cernohorsky, *Marine shells of the Pacific*, 1 : 65, pl. 8, fig. 32.  
 1979. *Basilitronea isabella isabella* : Mallik, *Marine Geology*, 29 : 375, fig. 29G.

*Material* : Kalpeni: 1 ex., Coll. Mallik.

*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, 186334. *Lyncina argus* (Linnaeus)

1758. *Cypraea argus* Linnaeus, *Syst. Nat.*, ed. 10 : 719, sp. 287 (Type locality : "O. Africae").  
 1967. *Lyncina argus* : Cernohorsky, *Marine shells of the Pacific*, 1 : 65, pl. 8, fig. 33.  
 1979. *Arestorides argus argus* : Mallik, *Marine Geology*, 29 : 375, fig. 29 D.

*Material* : Kalpeni: 1 ex., Coll. Mallik.

*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)

1758. *Cypraea carneola* Linnaeus, *Syst. Nat.*, ed. 10 : 719, no. 290 (Type locality : Asia).

1906 *Cypraea carneola* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 611.

1967. *Lyncina carneola* : Cernohorsky, *Marine shells of the Pacific*, 1 : 66, pl. 8, fig. 35.

*Material* : Kavaratti: 1 exs., Coll. B.P.H., 1984; 1 ex., Coll. D.R.K.S., 9.2.1986.

*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)

1758. *Cypraea lynx* Linnaeus, *Syst. Nat.*, ed. 10 : 721, sp.no. 303 (Type locality : Madagascar).

1906. *Cypraea lynx* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 612.

1985. *Lyncina lynx* : Mookherjee, *Rec. zool. Surv. India occ. Paper*, 75 : 28, pl. 4, fig. 15.

*Material* : Minicoy: 1 ex., Coll. D.R.K.S., 14.2.1986.

*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.

*Distribution* : India - Lakshadweep, Madras, Andaman and Nicobar Islands. *Elsewhere* : Throughout tropical Indo-Pacific (Cernohorsky, 1967).

### 37. *Lyncina vitellus* (Linnaeus)

1758. *Cypraea vitellus* Linnaeus, *Syst. Nat.*, ed. 10 : 721, no. 300 (Type locality : "ad Sudam Asiae").

1967. *Lyncina vitellus* : Cernohorsky, *Marine shells of the Pacific*, 1 : 68, pl. 9, fig. 38.

*Material* : Kavaratti: 1 ex., Coll. D.R.K.S., 5.2.1986; Minicoy: 1 ex., Coll. G.C.R., 15.3.1983; Lakshadweep: 7 exs., Coll. No data.

*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").

1985. *Mauritia arabica* : Mookherjee, *Rec. zool. Surv. India Occ. Paper*, 75 : 29, pl. 4, fig. 16.

**Material** : Kavaratti: 2 exs., Coll. D.R.K.S., 8-9.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 17.2.1986.

**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.

**Distribution** : *India* - Lakshadweep, Gujarat, Bombay, Tuticorin, Gulf of Mannar, Krusadai Island, Madras, Visakhapatnam. *Elsewhere* : Common in coral reefs in shallow water from Red Sea to Polynesia.

#### 39. *Mauritia depressa* (Gray)

(Plate I. Figs. 11 & 12)

1824. *Cypraea arabica* var. *depressa* Gray, *zool. J. Lond.*, 1: 77.

1967. *Mauritia depressa* : Cernohorsky, *Marine shells of Pacific*, 1 : 68, pl. 9, fig. 41, 41a.

**Material** : Kavaratti: 2 exs., Coll. B.P.H., 5.4.1984; 3 exs., Coll. D.R.K.S., 5 & 8.2.1986.

**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 (Cernohorsky, 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').

1979. *Arabica histrio histrio* : Mallik, *Marine Geology*, 29 : 375, fig. 29B.

**Material** : Kalpeni: 1 ex., Coll. Mallick.

**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)

1791. *Cypraea scurra* Gmelin, *Syst. Nat.*, ed. 13 : 3409, sp. 122 (Type locality : 'Mari Indico').

1967. *Mauritia scurra* Cernohorsky, *Marine shells of the Pacific*, 1 : 71, pl. 10, fig. 46.

**Material** : Kavaratti: 1 ex., Coll. D.R.K.S., 5.2.1986.

**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 preceding two species in having cylindrical narrow body and rounded sides. The present material is represented by a single worn out 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").

1906. *Cypraea moneta* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 612.

1985. *Monetaria moneta* : Mookherjee, *Rec. zool. Surv. India Occ. paper*, 75 : 31, p. 4, fig. 18.

**Material** : Kavaratti: 2 exs., Coll. B.P.H., 27-30.3.1984; 3 exs., Coll. D.R.K.S., 5-8.2.1986; Minicoy: 2 exs., Coll. D.R.K.S., 14-15.2.1986; Kalpeni: 2 exs., Coll. D.R.K.S., 22.2.86.

**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.

*Distribution* : India : Lakshadweep, Bombay, Pamban Krusadai Island, Rameswaram, Tuticorin, Andaman and Nicobar Islands. *Elsewhere* : From Red sea to Polynesia, Hawaii. Indo-Pacific (Cernohorsky, 1967).

#### Genus 29. *Talparia* Troschel, 1863

Single species is represented here under this genus.

##### 43. *Talparia talpa* (Linnaeus)

1758. *Cypraea talpa* Linnaeus, *Syst. Nat.*, ed. 10 : 720. no. 292 (Type locality : "In Asia").

1967. *Talparia talpa* : Cernohorsky, *Marine shells of the Pacific*, 1 : 64, pl. 8, fig. 31.

1972. *Talparia talpa talpa* : Mallick, *Marine Geology*. 29 : 375, fig. 29c.

*Material* : Kavaratti: 1 ex., Coll. D.R.K.S., 8.2.1986; Kalpeni: 1 ex., Coll. Mallick.

*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.

*Distribution* : India : Lakshadweep, Pamban, Andaman and Nicobar Islands. *Elsewhere* : Tropical Indo-Pacific.

#### 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

1758. *Strombus gibberulus* Linnaeus, *Syst. Nat.*, ed. 10 : 744, sp. 433 (Type locality : "O. Asiae").

1906. *Strombus gibberulus* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 612.

1921. *Strombus gibberulus* : Homell, *Madras Fish, Bull.* 14 : 213.

1985. *Strombus (Gibberulus) gibberulus gibberulus* : Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 75 : 15, pl. 2, figs. 5a, 5b.

*Material* : Minicoy: 3 exs., Coll. G.C.R., 15.3.198; Kavaratti: 2 exs., Coll. B.P.H., 1.1.1980; 1ex. Coll. B.P.H., 30.3.1984; Amini: 2 exs., Coll. G.C.R., 27.2.1983.

*Measurements* : L. 30.10 - 47.12; W. 16.12 - 23.55

**Remarks** : Shell white in colour, aperture violet; prominent deep notch present towards anterior part of outer lip. It inhabits coral reefs. Some of the shells found occupied by hermit crabs, *Cenobita perlatus* Milne Edwards.

**Distribution** : *India* : Lakshadweep, Bombay, Krusadai Island, Gulf of Mannar, Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in Indo-Pacific region from East Africa to Marshall and Tuamotu Islands (Subba Rao, 1971).

#### Subgenus *Canarium* Schumacher, 1817

#### 45. *Strombus (Canarium) mutabilis* Swainson

1821. *Strombus mutabilis* Swainson, Zool. Illustr., (1) 2. pl.71, (Type locality : East Indies).  
 1906. *Strombus floridus* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 612.  
 1985. *Strombus (Canarium) mutabilis* : Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 75 : 12, pl. 1, fig. 2.

**Material** : Minicoy: 1 ex., Coll. G.C.R., 15.3.1983; Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Androth: 1 ex., Coll. G.C.R., 22.2.1983; Kavaratti: 6 exs. Coll. B.P.H., 27-30.3.1984; e exs., Coll. D.R.K.S., 5.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Tuticorin, Andaman and Nicobar Islands. *Elsewhere* : From Natal to Marshall Island, Karachi, Maldives, Sri Lanka, Mergui Archipelago, Singapore, Hawaii, Marquesas and Eastern Islands.

#### Genus 31. *Lambis* Roeding, 1798

#### Subgenus *Lambis* s. str.

#### 46. *Lambis (Lambis) lambis* (Linnaeus)

1758. *Strombus lambis* Linnaeus, *Syst. Nat.*, ed. 10 : 743, sp. 425, (Type locality : 'O. Asiae').  
 1982. *Lambis (Lambis) lambis* : Subba Rao, *J. mar. biol. Ass. India*, 19 (1977) : 23 pl. 1, fig. A.B.

**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 Nagabhushanam and Rao (1972) and from Cheryam Island by Mallik (1979).

**Distribution** : *India* : Lakshadweep, Tuticorin, Devipattinam, Palk bay, Pamban, Krusadai Island, Andaman and Nicobar Islands. *Elsewhere* : Mozambique to Fiji Islands in Indo Pacific area.

#### 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').

1982. *Lambis (Harpago) chiragra chiragra* : Subba Rao, *J. mar. biol. Ass. India*, 19 (1977) : 25, pl. 1, figs. E & F.

**Material** : Kavaratti: 2 exs., Coll. D.R.K.S., 4-8.2.1986; Kalpeni: 1 ex., Coll. Mallik.

**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.

**Distribution** : *India* : Lakshadweep and Andaman and Nicobar Islands. *Elsewhere* : Maldives, Sri Lanka, Burma, Thailand, Indonesia, Malaysia, Philippines, Eastern Indian Ocean to Eastern Polynesia (Abbott, 1961).

#### Family XVI VANIKORIDAE

#### Genus 32. Vanikoro Quoy and Gaimard, 1833

#### 48. *Vanikoro cancellata* (Lamarck)

1822. *Sigaretus cancellatus* Lamarck, *Hist. nat. Anim. sans Vert.*, 6 (2) : 208.

1972. *Vanikoro cancellata* : Cernohorsky, *Marine shells of the Pacific*, 2 : 86, pl. 21, fig. 8.

**Material** : Minicoy: 1 ex., Coll. G.C.R., 13.3.1983; Kavaratti: 1 ex., Coll. D.R.K.S., 8.2.1986.

**Measurements** : L. 17.40 - 23.05; W. 17.85 - 26.10

**Distribution** : *India* : Lakshadweep, Kanyakumari, and Andaman and Nicobar Islands. *Elsewhere* : Persian Gulf, Zanzibar, Mauritius, Maldives, Seychells, Malagasy. Common in central and western Pacific (Cernohorsky, 1972). It has been recorded from Minicoy by Hornell (1921).

#### 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

1934. *Saptadanta nasika* Prashad and Rao, *Rec. Indian Mus.*, 36 (1) : 3, pl. 2, figs. 3a-3b. (Type locality : Andamans on *Trochus niloticus* Linnaeus).

1967. *Sabia nasika* : Hyman, *The Invertebrates*, 6, Moll., 1 : 383.

1977. *Saptadanta nasika* : Rajagopal, *Rec. zool. Surv. India* 73 : 271.

**Material** : Kadmat: 15 exs., Coll. B.P.H., 4-11.4.1984 (on *Conus coronatus*;

*Turbo argyrostoma*, *Trochus stellatus*); Kalpeni: 1 ex., Coll. D.R.K.S., 22.2.1986; Kavaratti: coll. D.R.K.S., 5.2.1986; 1 ex., Coll. B.P.H., 29.3.1984 (on *Mitra cucumerina*); Minicoy: Several exs., Coll. D.R.K.S. 15.2.1986 (on *Thais tuberosa*).

*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) gualtieriana* Recluz

1943. *Natica gualtieriana* Recluz, *Proc. zool. Soc. London*, pt. 11 : 208 (Type locality : Sual Island of Luzon, Philippines).

1971. *Natica (Natica) gualtieriana* : Cernohorsky, *Rec. Auckland Inst. Mus.*, 8 : 180, figs. 21-25.

*Material* : Androth: 1 ex., Coll. G.C.R., 22.2.1983; Minicoy: 1 ex., Coll. G.C.R., 10.3.1983, 1 ex., Coll. D.R.K.S., 15.2.1986.

*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. gualtieriana*; *N. marochiensis* Gmelin is restricted to Carribean waters. 'No naticid species has had a more confused taxonomic history than the common Indo-Pacific *Natica gualtieriana*' (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').

1971. *Natica (Natica) vitellus* : Cernohorsky, *Rec. Auckland Inst. Mus.*, 8 : 173, figs. 5.

**Material** : Minicoy: 2 exs., Coll. D.R.K.S., 18.2.1986.

**Measurements** : L. 11.85 - 15.24; W. 10.15 - 12.88

**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 Nôvo, 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 maura* Lamarck, *Tableau Encyclopadique et Methodique* 10 : pl. 453, figs. 4a-b, (Type locality : Indian Ocean, Lamarck, 1822).

1971. *Polinices (Mamilla) maurus* : Cernohorsky, *Rec. Auckland Ist. Mus.*, 8 : 196, figs. 59-61 (for other Synonyms).

**Material** : Androth: 1 ex., Coll. G.C.R., 22.2.1983.

**Measurements** : L. 21.55; W. 17.45

**Description** : Shell light brown, spire white, aperture semioval, wide, parietal callous dark brown, interior dull.

**Remarks** : This species closely resembles *P. melanostomus* but differs in not having brown bands on body whorl, and the parietal callous 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 (Mammilla) melanostomus* (Gmelin)

1791. *Nerita melanostoma* Gmelin, *Syst. Nat.*, ed. 13 : 3674 (Refers Lister, pl. 566, fig. 15; Chemnitz, 1781, *Syst. Conch. Cab.*, 5 : 278, pl. 189, figs. 1926, 1927; Type locality : in 'mari indico' = Indian Seas).

1906. *Mamilla melanostoma* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 616.

1985. *Polinices (Mammilla) melanostomus* : Mookherjee, *Rec. zool. Surv. India Occ. Paper.*, 75 : 52, pl. 8, fig. 35a-b.

**Material** : Lagoon beach, Minicoy: 6 exs., Coll. G.C.R. 10-14.3.1983.

**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).

*Distribution* : India : Lakshadweep, Bombay, Madras, Kanyakumari, Tuticorin, Krusadai id., Shingle id. Hare id., Andamans. *Elsewhere* : Malagasay, East Indies, Philippines, Fiji, Western Polynesia, New Guinea, New Ireland.

#### Subgenus *Polinices* s. str.

#### 54. *Polinices (Polinices) tumidus* (Swainson)

1840. *Mamillaria tumida* Swainson, *Treat. Malac.* : 345 (refers Chemnitz, 1781, *Syst. Cab.*, 5, 280, pl. 189, figs. 1928-31, non binom). Type locality; East Indies and Tranquebar. Chemnitz 1781).

1971. *Polinices (Polinices) tumidus* : Cernohorsky, *Rec. Auckland Ins. Mus.*, 8 : 191 figs. 45, 47-50.

*Material* : Minicoy: 2 exs., Coll. G.C.R., 13-14.3.1983.

*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.

*Distribution* : India : Lakshadweep, Bombay, Goa, Trivandrum, Tranquebar, Rameswaram, Tuticorin, Krusadai Island, Madras, Orissa coast and Andaman and Nicobar Islands. *Elsewhere* : Maldives, Fiji, common in Indo-Pacific region. Mookherjee (1985) gave detailed distribution.

#### Family XIX CASSIDAE

#### Genus 36. *Casmaria* H. and A. Adams, 1853

#### 55. *Casmaria ponderosa ponderosa* (Gmelin)

1791. *Buccinum ponderosum* Gmelin, *Syst. Nat.*, ed. 3 : 3477, no. 28 (Type locality : Not given).

1972. *Casmaria ponderosa* : Cernohorsky, *Marine Shells of the Pacific*, 2 : 106, pl. 29, fig. 3, 3a.

*Material* : Minicoy: 1 ex., Coll. D.R.K.S. 15.2.1986.

*Measurments* : 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)

1758. *Buccinum rufum* Linnaeus, *Syst. Nat.*, ed. 10 : 736, sp. 385 (Type locality : "Oceano Americano (Erroneous-Designated 'Amboina, Indonesia by Abbott, 1968)
1968. *Cypraecassis (Cypraecassis) rufa* : Abbott, *Indo-Pacif. Mollusca*, 2 (9) : 69, pl. 3, fig. 10; pl. 4, figs. 10-12; pls. 44-46
1979. *Cypraecassis (Cypraecassis) rufa* : Mallik, *Marine Geology*, 29 : 375, fig. 31.

*Material* : Kalpeni: 1 ex., Coll. Mallik.

*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'

*Distribution* : *India* : Lakshadweep, Andaman & Nicobar Islands. *Elsewhere* : Maldives, East Africa to Eastern Polynesia.

Family XX TONNIDAE

Genus 38. *Malea* Valenciennes in Humboldt, 1832

57. *Malea pomum* (Linnaeus)

1758. *Buccinum pomum* Linnaeus, *Syst. Nat.* ed. 10 : 735, sp. no. 379, (Type locality : Not given).
1906. *Dolium pomum* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 611.
1972. *Malea pomum* : Cernohorsky, *Marine shells of the Pacific*, 2 : 112, pl. 32, fig. 1.
1979. *Tonna pomum* : Mallik, *Marine Geology*, 29 : 378, fig. 30.

*Material* : Agatti: 1 ex., Coll. B.P.H., 6.4.1984; Kalpeni and Cheriya: 1 ex., Coll. Mallik.

*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).

**Distribution** : India : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Sri Lanka, Mauritius, Singapore. Common in Indo-Pacific region.

Family XXI CYMATIIDAE

Genus 39. **Charonia** Gistel, 1848

58. **Charonia tritonis** (Linnaeus)

1758. *Murex tritonis* Linnaeus, *Syst. Nat.*, ed. 10 : 754, sp. 488 (Type locality : Archipelago, America).

1967. *Charonia tritonis* : Cernohorsky, *Marine shells of the Pacific*, 1 : 58, pl. 7, fig. 26.

**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.

**Distribution** : India : Lakshadweep, Nicobars. *Elsewhere* : Sri Lanka, East Africa to Polynesia, Hawaiian Islands, Florida, Carribean (Cernohorsky, 1967). Common in Indo-Pacific (Abbott and Dance, 1982).

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,

**Material** : Minicoy: 1 ex., Coll. D.R.K.S., 15.2.1986.

**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 whorls including protoconch, body whorl large, rounded, suture distinct, sculptured with prominent spiral cords and axial ribs more prominent on spiral whorls 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').

1967. *Cymatium pileare* : Cernohorsky, *Marine shells of the Pacific*, 1 : 50, pl. 3, figs. 9-10.

*Material* : Minicoy: 2 exs., Coll. D.R.K.S., 19.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Porbandar in Gujarat, Pamban in Tamil Nadu, and Andaman and Nicobars. *Elsewhere* : Red sea to Polynesia, Hawaiian Islands (Cernohorsky, 1967).

### 61. *Cymatium nicobaricum* (Roeding)

1798. *Tritonium nicobaricum* Roeding, *Museum Boltenianum* : 126, sp. 1630 (Type locality : Not given).

1906. *Litorium chlorostoma* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 610.

1967. *Cymatium nicobaricum* : Cernohorsky, *Marine Shells of the Pacific*, 1 : 50, pl. 3, fig. 11.

*Material* : Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Minicoy: 2 exs., Coll. G.C.R., 10-11.3.1983.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : West Indies, Maldives, Indo-Pacific.

### 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).

1972. *Cymatium (Ranularia) sinense* : Cernohorsky, *Marine shells of the Pacific*, 2 : 115 pl. 33, figs. 7-7a.

*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 vespereum* (Lamarck)

1843. *Triton vespereus* Lamarck, *Hist. nat. des Anim. sans vert.* (ed. Deshayes), 9 : 636 (Type locality : Not known).

1967. *Cymatium vespereum* : Cernohorsky, *Marine shells of the Pacific*, 1 : 52, pl. 4, fig. 15.

**Material** : Kavaratti: 2 exs., Coll. B.P.H., 27.3.1984; Minicoy: 4 exs., Coll. G.C.R., 10.3.1983.

**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'

### Genus 41. *Bursa* Roeding, 1798.

#### 64. *Bursa bufonia* (Gmelin)

1791. *Murex bufonius* Gmelin, *Syst. Nat.*, ed. 13 : 3584, sp. 32, (Type locality : "Umari : Mediterraneo")

1906. *Ranella bufonia* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 611.

1967. *Bursa bufonia* : Cernohorsky, *Marine shells of the Pacific*, 1 : 42, pl. 2, fig. 2.

**Material** : Kavaratti: 2 exs., Coll. D.R.K.S., 5-6.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 17.2.1986.

**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)

1841. *Ranella cruentata* Sowerby, *Proc. zool. Soc. Lond.*, (1841) : 51; *Conch. Illustr.*, fig. 5 (Type locality : Philippines).

1967. *Bursa cruentata* : Cernohorsky, *Marine shells of the Pacific*, 1 : 42, pl. 2, fig. 7.

*Material* : Lagoon beach, Minicoy: 1 ex., Coll. G.C.R., 10.3.1983.

*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)

1798. *Tritonium granulare* Roeding, *Museum Boltenianum* : 127, sp. 1641 (Refers Martini *Conch. Cab.*, 4, pl. 127, figs, 1226, 1227) (Type locality : Not given).

1967. *Bursa granularis* : Cernohorsky, *Marine shells of the Pacific*, 1 : 44, pl. 1, fig. 4 (for other synonyms).

*Material* : Lagoon beach, Minicoy: 1 ex., Coll. G.C.R., 10.3.1983.

*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.

*Distribution* : *India* : Lakshadweep, Krusadai Island, Kundugal point, Pamban. *Elsewhere* : Maldives, East Africa to Polynesia, Hawaiian, S.E. Florida, West Indies (Cernohorsky, 1967).

Order NEOGASTROPODA

Family XXIII MURICIDAE

Genus 42. *Chicoreus* Montfort, 1810

#### 67. *Chicoreus crocatus* (Reeve)

(Plate II. Figs. 19 & 20)

1845. *Murex crocatus* Reeve, *Proc. zool. Soc. Lond.* (1845) : 108 : *Conch. Icon.*, 3, *Murex* sp. 168 pl., 33 fig. 168 (Type locality : Not given).

1880. *Murex crocatus* : Tryon, *Man. conch.*, 2 : 97, pl. 19, fig. 181, pl. 20, fig. 192.

*Material* : Minicoy: 1 ex., coll. G.C.R., 15.3.1883.

*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

1758. *Murex tribulus* Linnaeus, *Syst. Nat.* ed. 10 : 746 (Type locality : "O. Asiae" = Indian Ocean).

1976. *Murex tribulus* : Radwin and d'Attilio, *Murex shells of the world* : 72 pl. 10, figs. 8 & 9, text figs, 40-42

1979. *Murex tribulus* : Mallik, *Marine Geology*, 29 : 375, fig. 32.

*Material* : Lakshadweep sea, St. No. 272; 1 ex., Coll. Marine Survey, 27.12.1900 (depth : 1650 M); 11 exs., Lakshadweep sea, Stn. No. 271, (depth : 40.2 M), Coll. Marine Survey, 16.11.1900; Kalpeni: 1 ex., Coll. Mallik.

*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 fishermen's nets. Highly variable in its colouration, sculpture etc. Radwin and d'Attilio (1976) studied the polymorphism of this species.

*Distribution* : *India* : Lakshadweep. Very common on the coasts of Indian main land and Andaman and Nicobar Islands. *Elsewhere* : Indo-west Pacific.

#### Genus 44. *Maculotriton* Dall, 1904

##### 69. *Maculotriton serriale* (Deshayes, in Laborde & Linant)

1834. *Buccinum serriale* Laborde & Linant, *Voyage de l'Arabie Petree* : 66, figs. 32-34 (Type locality : Red Sea).

1972. *Maculotriton serriale* : Cernohorsky, *Marine shells of the Pacific*, 2 : 129, pl. 36, fig. 11.

*Material* : Kadmat: 1 ex., Coll. B.P.H., 1.4.1984; Minicoy: 1 ex., Coll. D.R.K.S., 12.2.1986.

*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), Andamans. **Elsewhere** : Maldives (Smith, 1906) Philippines, Aden, Sandwich Island. Widely distributed species, moderately common in Pacific (Cernohorsky, 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 Cernohorsky, 1973.)  
 1973. *Drupa morum morum* : Emerson & Cernohorsky : *Indo-Pacif. Mollusca* 3 (13) : 15, pl. 2, figs. 1-3; pls. 10, 11 (for other references).

**Material** : Kavaratti: 6 exs., Coll. B.P.H., 30.3.1984; 3 exs., Coll. D.R.K.S., 4-6.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 12.2.86; 7 exs., Coll. G.C.R., 10.3.1983; Kiltan Id: 17 exs., Coll. G.C. Rao, 2.3.1983; Androth: 2 exs., Coll. G.C.R., 2.3.1983.

**Measurements** : L. 24.36 - 27.00; W. 23.36 - 24.10

**Remarks** : Adequate description and distribution have been given by Emerson & Cernohorsky (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).

**Distribution** : India : Lakshadweep, Pamban, Shingle Island, Andaman and Nicobar Islands. **Elsewhere** : Maldives, Red Sea, Tanzania, East Africa to Eastern Pacific (Emerson and Cernohorsky, 1973).

#### 71. *Drupa (Drupa) ricinus ricinus* (Linnaeus)

1758. *Murex ricinus* Linnaeus, *Syst. Nat.*, ed. 10 : 750 sp. 464, (Type locality : "O Asiatico").  
 1906. *Sistrum ricinus* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 609.  
 1973. *Drupa (Drupa) ricinus ricinus* : Emerson and Cernohorsky, *Indo-Pacific. Mollusca*, 3 (13) : 19, pl. 2, figs. 6-8, 11; pls. 14-16.

**Material** : Kavaratti: 4 exs., Coll. B.P.H., 27.3.1984; 4 exs., Coll. D.R.K.S., 5-9.2.1986; Minicoy: 21 exs., Coll. G.C.R., 10 & 15.3.1983; 1 ex. Coll. D.R.K.S., 17.2.1986; Kadmat: 10 exs., Coll. B.P.H., 11.4.1984; Kiltan: 7 exs., Coll. G.C.R., 3.3.1983.

**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*.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Mauritius, Sri Lanka, Singapore. From East and South Africa to Eastern Pacific (Emerson and Cernohorsky, 1973).

#### 72. *Drupa (Ricinella) clathrata miticula* (Lamarck)

1822. *Ricinula miticula* Lamarck, *Hist. Nat. Anim. sans Vert.*, 7 : 23 (Type locality : Mahebourg, Mauritius and lectotype designated by Emerson and Cernohorsky (1973).  
1973. *Drupa (Ricinella) clathrata miticula* : Emerson and Cernohorsky, *Indo-Pacific Mollusca*, 3 (13) : 33, pl. 2, figs. 19-20; pls. 28, 30.

**Material** : Kavaratti: 1 ex., Coll. D.R.K.S., 9.2.1986; Minicoy: 2 exs., Coll. G.C.R., 10.3.1983.

**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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

#### 73. *Drupa (Ricinella) rubusidaeus* Roeding

1798. *Drupa rubusidaeus* Roeding, *Museum Boltzenianum* : 55, sp. No. 698, (Type locality : Davao Bay, Mindanao, Philippines, designated by Emerson and Cernohorsky 1973).  
1921. *Ricinula hystrix* : Hornell, *Madras Fish Bull.*, 14 (6) : 214.  
1973. *Drupa (Ricinella) rubusidaeus* : Emerson and Cernohorsky, *Indo-Pacif. Mollusca*, 3 (13) : 27, pl. 2, figs. 13-15; pl. 22 & 23.

**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 made by hipponicid, *Saptadanta nasika* on its outer margin.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Red Sea to East Africa; throughout Indo-Pacific to Hawaii and Tuamata Islands (Emerson & Cernohorsky, 1973).

#### Subgenus *Drupina* Dall, 1923

#### 74. *Drupa (Drupina) lobata* (Blainville)

1832. *Purpura lobata* Blainville, *Nouv. Ann. Mus. d'Hist. Nat. Paris*, (3) 1 : 210, pl. 9, fig. 7 (Type locality : "Mogadiscio, Somalia" designated by Emerson and Cernohorsky, 1973).  
1906. *Sistrum digitatum* var. *lobata* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 609.

1973. *Drupa (Drupina) lobata* : Emerson and Cernohorsky, *Indo-Pacif. Mollusca*, 3 (13) : 38, pl. 2, figs. 25, 26; pls. 34, 35.

**Material** : Kavaratti: 1 ex. Coll. G.C.R., 6.3.1983; 1 ex., Coll. D.R.K.S., 7.2.1986; 5 ex., Coll. B.P.H., 27.3.1984; Minicoy: 4 exs., Coll. G.C.R., 10-15.3.1983, 2 exs. Coll. D.R.K.S., 1-15.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Red sea, East Africa to Australia.

#### Genus 46. *Cronia* H. & A. Adams, 1853

##### Subgenus *Ergalatax* Iredale, 1931

#### 75. *Cronia (Ergalatax) contracta* (Reeve)

1846. *Buccinum contractum* Reeve, *Conch. Icon.*, 3, *Buccinum*, sp. 53, pl. 8, fig. 53. (Type locality : Samar Island, Philippines).

1976. *Cronia (Ergalatax) contracta* : Cernohorsky, *Rec. Auckland Inst. Mus.*, 13 : 123, figs. 37-47 (other synonyms).

**Material** : Kavaratti: 1 ex., Coll. G.C.R., 1.1.1980; 1 ex., Coll. B.P.H., 27.3.1984; 1 ex., Coll. D.R.K.S., 8.2.1986; Minicoy: 3 exs., Coll. G.C.R., 13-15.3.1983.

**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.

**Distribution** : *India* : Lakshadweep, Okha, Bedi, Porbander, Bombay, Karwar, Pulli Island, Pamban, Waltair, Ganjam, Andaman and Nicobar Islands. *Elsewhere* : Persian Gulf to Philippines; an Indo-Pacific species.

#### Genus 47. *Drupella* Thiele, 1925

#### 76. *Drupella cornus* (Roeding)

1798. *Drupa cornus* Roeding, *Museum Boltzenianum* ; 56, sp. 704 (refers Gmelin, 1791. Type locality : not given).

1906. *Sistrum elatum* : Smith, In : Gardiner's *Fauna and Geography Marine shells of the Pacific*, 2: 125, pl. 35, figs. 7, 7a.

1972. *Drupella cornus* : Cernohorsky, *Marine shells of the Pacific*, 2; 125. pl. 35, figs. 7, 7a.

**Material** : Kiltan Island: 2 exs., Coll. G.C.R., 2.3.1983; Kavaratti: 1 ex., Coll. D.R.K.S., 8.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Sri Lanka, Philippines to Paumotus.

#### 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).

1972. *Morula anaxeres* : Cernohorsky, *Marine shells of the Pacific*, 2 : 126, pl. 35, fig. 10.

*Material* : Kavaratti: 1 ex., Coll. B.P.H., 27.3.1984; 2 exs. Coll. D.R.K.S., 5.2.1986; Lagoon beach, Minicoy: 1 ex., Coll. G.C.R., 10.3.1983; Minicoy: 1 ex., Coll. D.R.K.S., 15.2.1986; Kalpeni: 2 exs., Coll. D.R.K.S., 22.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Madras, Andaman and Nicobar Islands. *Elsewhere* : Malagasy, Red Sea, Persian Gulf, Karachi, Sri Lanka, Mergui Archipelago. Widely distributed throughout tropical Pacific (Cernohorsky, 1972). This is the first record from these Islands.

##### 78. *Morula granulata* (Duclos)

1832. *Purpura granulata* Duclos, *Ann. Sci. Nat.*, 2, fig. 9.

1906. *Sistrum tuberculatum* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, 2 : 609.

1972. *Morula granulata* : Cernohorsky, *Marine shells of the Pacific*, 2 : 127; pl. 36. fig. 2.

*Material* : Minicoy: 60 exs., Coll. D.R.K.S., 12.2.1986; Kadmat: 2 exs., Coll. B.P.H., 11.4.1984; Agatti: 1 ex., Coll. B.P.H., 5.4.1984; Kavaratti: 1 ex., Coll. B.P.H.

*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 Boltenianum* : 56, sp. 703, (Type locality : Not given).

1972. *Morula uva* : Cernohorsky, *Marine shells of the Pacific*, 2 : 127, pl. 36, fig. 3.

*Material* : Kiltan Id: 17 exs. coll. B.P.H.; Kavaratti: 4 exs., Coll. B.P.H., 30.3.1984; Minicoy: 5 exs., Coll. D.R.K.S. 17 & 19.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Sri Lanka, Mauritius, Seychelles, Formosa, Tahati. Slightly less common, throughout tropical Pacific (Cernohorsky, 1972).

Genus 49. *Purpura* Bruguiere, 179880. *Purpura panama* (Roeding)

1798. *Thais panama* Roeding, *Museum Boltenianum* : 54 (Refers Chemnitz, 1794, *Conch. Cab*, 10, pl. 54, figs. 1467, 1468 (Type locality : Tranquebar).

1982. *Purpura panama* : Abbott and Dance, *Compendium of Sea shells* : 146, fig.

*Material* : Lagoon beach, Minicoy: 2 exs., Coll. G.C.R., 10.3.1983 & 14.3.1983.

*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, Maharashtra, 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, 179881. *Thais armigera* (Link)

1807. *Purpura armigera* : Link, *Beschr. Natur, Sammlung Univ. Rostock*, 8 (refers Chemnitz, 1796 *Conch. Cab.* 11, pl. 117, figs. 1798).

1906. *Purpura armigera* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 609.

1967. *Thais armigera* : Cernohorsky, *Marine shells of the Pacific*, 1 : 130, pl. 28, fig. 170.

*Material* : Kavaratti: 1 ex., Coll. G.C.R., 6.3.1983

*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)

1758. *Murex hippocastanum* Linnaeus, *Syst. Nat.*, ed. 10 : 751, sp. 471 (Type locality : "O. Asiae").

1906. *Purpura hippocastanum* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 609.

1967. *Thais hippocastanum* : Cernohorsky, *Marine shells of the Pacific*, 1 : 130 pl. 28, fig. 172.

*Material* : Kavaratti: 1 ex., Coll. B.P.H., 27.3.1984; 1 ex., Coll. G.C.R., 1.1.1980; Minicoy: 2 exs., Coll. B.P.H., 11.12.1979; 1 ex., Coll. D.R.K.S., 17.2.1986.

*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.

*Distribution* : India : Lakshadweep, Bombay, Andaman and Nicobar Islands. *Elsewhere* : Mauritius, Maldives, Sri Lanka, Burma, Malaysia. Throughout Indo-Pacific (Cernohorsky, 1967).

### 83. *Thais intermedia* (Kiener)

1836. *Purpura intermedia* Kiener, *Icon, Coq. Viv.*, 9, *Purpura*, : 51, pl. 12, fig. 34 (Type locality : Senegal).

1967. *Thais intermedia* : Cernohorsky, *Marine shells of the Pacific*, 1 : 130, pl. 28, fig. 173.

*Material* : Kavaratti: 1 ex., Coll. G.C.R., 19.3.1983.

*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 (Cernohorsky, 1967). This is the first record from these Islands.

84. *Thais tuberosa* (Roeding)

1798. *Purpura tuberosa* Roeding, *Museum Boltenianum* : 141, sp. 1776 (refers Martini Chemnitz *Conch. Cab.*, 3, pl. 108 fig. 1015; (Type locality : Not given).

1906. *Purpura pica* : Smith, In : Gardiners' *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 609.

1967. *Thais tuberosa* : Cernohorsky, *Marine shells of the Pacific*, 1 : 130, pl. 28, fig. 174.

**Materials** : Kavaratti: 3 exs. Coll. G.C.R., 1.1.1980; 6.3.1983 and 20.3.1983; 2 exs. Coll. D.R.K.S., 5-8.2.1986; Minicoy: 1 ex. Coll. G.C.R., 10.3.1983; 4 exs., Coll. D.R.K.S., 15-19.2.86; 1 ex., Coll. B.P.H., 13.1.1984.

**Measurements** : L. 36.50 - 47.50; W. 28.52 - 32.38

**Remarks** : This species closely resembles *Thais hippocastanum* but differs in the absence of denticles on the inner margin of the outer lip, but having lirations; spire short. It also closely resembles *Thais armigera* but differs in having dark brown blotches on apertural margins and short spire. Some of the shells found inhabited by hermit crabs, *Coenobita rugosus* Milne Edwards, *C. perlatus* Milne Edwards, *Calcinus gaimardii* Milne Edwards and *C. herbstii* de Man.

**Distribution** : *India* : Lakshadweep, Gulf of Mannar, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Throughout Indo-Pacific, moderately common (Cernohorsky, 1967).

Genus 51. *Rapana* Schumacher, 181785. *Rapana rapiformis* (Born)

1798. *Murex rapiformis* var. d Bom, *Index rerum naturalium Musei Caesarei Vindobonensis* pt. 1.

1972. *Rapana rapiformis* : Cernohorsky, *Marine shells of the Pacific*, 2 : 124, pl. 35, fig. 6.

**Material** : Agatti: 1 ex., Coll. B.P.H., 4.4.1984.

**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 of body 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.

## Family XXIV CORALLIOPHILIDAE

Genus 52. *Coralliophila* H. & A. Adams, 185386. *Coralliophila neritoidea* (Lamarck)

1816. *Fusus neritoideus* Lamarck, *Tableau Encyclopede Methodique*, Paris : ?

1972. *Coralliophila violacea* : Cernohorsky, *Marine shells of the Pacific*, 2 : 131, pl. 37, fig. 5.

**Material** : Kavaratti: 1 ex., Coll. B.P.H., 30.3.1984; Agatti: 1 ex., Coll. B.P.H., 5.4.1984; Lakshadweep: 5 ex., Coll. D.R.K.S., 1986.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives. Common in Indo-Pacific shallow reefs (Abbott and Dance, 1982). It is recorded for the first time from these Islands.

Family XXV PYRENIDAE

Genus 53. *Pyrene* Roeding, 1798

Subgenus *Columbella* Lamarck, 1799

87. *Pyrene (Columbella) varians* (Sowerby)

1832. *Columbella varians* Sowerby, *Proc. zool. Soc. Lond.*, (1832) : 118.

1972. *Pyrene (Columbella) varians* : Cernohorsky, *Marine shells of the Pacific*, 2 : 134, pl. 40, figs. 7, 7a.

*Material* : Kavaratti: 6 exs., Coll. B.P.H., 27-29.3.1984; 1 ex., Coll. D.R.K.S., 5.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 14.2.1986.

*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.

*Distribution* : *India* : Lakshadweep only. *Elsewhere* : Galapagos, Maldives. Moderately common. Occurs throughout tropical Pacific (Cernohorsky, 1972).

88. *Pyrene (Columbella) turturina* Lamarck

1822. *Columbella turturina* Lamarck, *Hist. nat. Anim. sans Vert.*, 10 : 273.

1906. *Columbella turturina* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, 2 : 608.

1972. *Pyrene (Columbella) turturina* : Cernohorsky, *Marine shells of the Pacific*, 2 : 133, pl. 40, fig. 5.

*Material* : Agatti: 1 ex., Coll. B.P.H., 4.4.1984.

*Measurements* : L. 11.20; W. 7.55

*Remarks* : This species can be distinguished from *variens* by its bulbous shape, transversely striated whorls, pinkish aperture with two rows of tubercles on columella.

**Distribution** : India: Lakshadweep. *Elsewhere* : Maldives, Philippines. Commonly occurs throughout tropical Pacific (Cernohorsky, 1972).

Family XXVI BUCCINIDAE

Genus 54. **Cantharus** Roeding, 1798

89. ***Cantharus (Pollia) undosus*** (Linnaeus)

1758. *Buccinum undosum* Linnaeus, *Syst. Nat.*, ed. 10 : 740, sp. 409 (Type locality : "Asia").  
 1972. *Cantharus (Pollia) undosus* : Cernohorsky, *Marine shells of the Pacific*, 2 : 141, pl. 38, fig.5.

**Material** : Minicoy: 1 ex., coll. D.R.K.S., 15.2.1986; Amini: 1 ex., Coll. G.C.R., 27.3.1983.

**Measurements** : L. 21.10; W. 13.75.

**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)

1846. *Ricinula lineata* Reeve, *Proc. zool. Soc. London (1846) Conch. Icon*, 3, Ricinula pl. 6, fig. 51 (Type locality : Island of Ticao, Philippines).  
 1972. *Engina lineata* : Cernohorsky, *Marine shells of the Pacific*, 2 : 143, pl. 39, fig. 4.

**Material** : Kavaratti: 20 ex., Coll. B.P.H., 27-30.3.1984; 5 exs., Coll. D.R.K.S., 5.2.1986; Kadmat: 3 exs., Coll. B.P.H., 11.4.1984; Minicoy: 9 exs., Coll. D.R.K.S., 12-19.2.1986; Agatti: 4 exs., Coll. B.P.H., 5.4.1984.

**Measurements** : L. 5.98 - 7.90; W. 3.60 - 3.95.

**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.

**Distribution** : *India* : Lakshadweep, Pamban. *Elsewhere* : Sri Lanka, Viti, Philippines. Throughout tropical Pacific (Cernohorsky, 1972).

91. *Engina mendicaria* (Linnaeus)

1758. *Voluta mendicaria* Linnaeus, *Syst. nat.*, ed. 10 : 731, sp. 360 (Type locality : "Asia")

1972. *Engina mendicaria* : Cernohorsky, *Marine shells of the Pacific*, 2 : 144, pl. 38, fig. 9.

*Material* : Kavaratti: 6 exs., Coll. B.P.H., 30.3.1984 & 11.4.1984.

*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.

*Distribution* : India - Lakshadweep, Madras, Andaman and Nicobar Islands.

*Elsewhere* : Red sea, Persian Gulf, Malagasy, Maldives, Sri Lanka, Burma, Philippines, Indonesia, Japan.

## Family XXVII NASSARIIDAE

Genus 56. *Nassarius* Dumeril, 1806

Subgenus *Alectrion* Montfort, 1810

92. *Nassarius (Alectrion) papillosus* (Linnaeus)

1758. *Buccinum papillosum* Linnaeus, *Syst. Nat.*, ed. 10 : 737, sp. 393 (Type locality : "O. Asiatico").

1972. *Nssarius (Alectrion) papillosus* : Cernohorsky, *Marine shells of the Pacific*, 2 : 152, pl. 45, fig. 2.

*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)

1852. *Nassa echinata* Adams, *Proc. zoo. Soc. Lond.*, (1852) : 101 (Type locality : Isle of Mindoro, Philippines).

1906. *Nassa echinata* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, 2 : 606.

1972. *Nassarius (Niotha) echinatus* : Cernohorsky, *Rec. Auckland Inst. Mus*, 9 : 157, figs. 76, 77, 79, 88, 92.

*Material* : Minicoy: 2 exs., Coll. D.R.K.S., 18.2.1986.

*Measurements* : L. 13.18 - 13.70; W. 8.55 - 9.90

*Remarks* : The species has been dealt in detail by Cernohorsky (1972).

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

Genus 57. *Hebra* H. & A. Adams, 1853

94. *Hebra horrida* (Dunker)

1847. *Buccinum horridum* Dunker, *Zeit. Malakozool.*, 4 : 59 (nom. subst. pro. *B. scabrum* Dunker, 1846).

1972. *Hebra horrida* : Cernohorsky, *Rec. Auckland Inst. Mus.*, 9 : 189, figs. 81-83, 94, 95 (for other synonyms).

*Material* : Lakshadweep: 2 exs., no other data. Minicoy: 1 ex. coll. G.C.R., 11.3.1983.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

Family XXVIII FASCIOLARIIDAE

The family includes three species under the genera, *Fasciolaria*, *Peristernia* and *Latirus*.

Genus 58. *Fasciolaria* Lamarck, 1799

Subgenus *Pleuroploca* Fischer, 1884

95. *Fasciolaria (Pleuroploca) filamentosa* (Roeding)

1798. *Fusus filamentosus* Roeding, *Museum Boltenianum* : 118, sp. 1524 (Type locality : Not given).

1972. *Fasciolaria (Pleuroploca) filamentosa* : Cernohorsky, *Marine shells of the Pacific*, 2 : 153, pl. 45, fig. 3.

*Material* : Kavaratti: 1 ex., Coll. G.C.R., 20.3.1983.

*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.

*Distribution* : *India* : Lakshadweep, Krusadai and Shingle Islands. *Elsewhere* : Indo-pacific. Common (Abbott and Dance, 1982).

Genus 59. *Peristernia* Moerch, 185296. *Peristernia nassatula* (Lamarck)

1822. *Turbinella nassatula* Lamarck, *Hist. nat. Anim. sans Vert*, 7 : ?  
 1906. *Peristernia nassatula* : Smith, In : Gardiner's *Fauna and Geography of the maldive and Laccadive Archipelagoes*, 2 : 605.  
 1921. *Peristernia nassatula* : Homell, *Madras Fish. Bull.* 14 (6) : 214.  
 1972. *Peristernia nassatula* : Cernohorsky, *Marine shells of the Pacific*, 2 : 158, pl. 47, fig. 3.

*Material* : Agatti: 1 ex., Coll. B.P.H., 6.4.1984; Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Kavaratti: 1 ex., Coll. D.R.K.S. 8.2.1986; Minicoy: 1 ex., Coll. G.C.R., 10.3.1986; 2 exs., Coll. D.R.K.S., 17.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Commonly occurs throughout Indo-Pacific (Abbott and Dance, 1982).

Genus 60. *Latirus* Montfort, 1810Subgenus *Latirolagena* Harris, 189797. *Latirus (Latirolagena) smaragdulus* (Linnaeus)

1758. *Buccinum smaragdulus* Linnaeus, *Syst. Nat.*, ed. 10 : 739, sp. 404 (Type locality : Not given).  
 1921. *Latirus (Leucozonina) smaraddulus* : Homell, *Madras Fish Bull.*, 14 (6) : 214.  
 1972. *Latirus (Latirolagena) smaragdulus* : Cernohorsky, *Marine shells of the Pacific*, 2 : 158, pl. 47, fig. 3.

*Material* : Kavaratti: 2 exs., Coll. G.C.R., 2 & 19.3.1983; 1 ex., Coll. B.P.H., 30.3.1984; 3 exs., Coll. D.R.K.S., 8 & 15.2.1986.

*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 its 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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

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 Garajos, Indian Ocean).

1972. *Latirus belcheri* : Cernohorsky, *Marine shells of the Pacific*, 2 : 155, pl. 1, fig. 6, pl. 46, figs. 2, 2a.

*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* : Cernohorsky (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 (Cernohorsky, 1972). This is the first record of this species from Indian waters.

#### 99. *Latirus gibbulus* (Gmelin)

1791. *Murex gibbulus* Gmelin, *Syst. Nat.*, ed. 13 : 3557, sp. 125.

1972. *Latirus gibbulus* : Cernohorsky, *Marine shells of the Pacific*, 2 : 154, pl. 45, fig. 8.

*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 pertatus* Milne Edwards.

Shell found with two depressions on its body whorl made by epizoic animals, probably *Saptadanta 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)

1758. *Murex ceramicum* Linnaeus, *Syst. Nat.*, ed. 10 : 751, sp. 470 (Type locality : "O. Asiae as Ceram").

1979. *Vasum (Vasum) ceramicus* : Mallik, *Marine Geology*, 29 : 375, fig. 33. (error) = *V. ceramicum*).

*Material* : Kavaratti: 2 exs., Coll. D.R.K.S., 7-8.2.1986; Kalpeni: 1 ex., Coll. Mallik.

*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, *Saptadanta nasika* Prasad and Rao.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Sri Lanka, East Africa to eastern Polynesia.

#### 101. *Vasum (Vasum) turbinellus* (Linnaeus)

1758. *Murex turbinellus* Linnaeus, *Syst. Nat.*, ed. 10 : 750, sp. 466 (Type locality : "O. Asiatico ad Nussaanan").

1921. *Vasum cornigera* : Hornell, *Madras Fish Bull.*, 14 (6) : 214.

1972. *Vasum turbinellus* : Cernohorsky, *Marine shells of the Pacific*, 2 : 164, pl. 49, figs. 2-2a.

*Material* : Kavaratti: 4 exs., Coll. D.R.K.S., 5, 8.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 14.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands, Madras. *Elsewhere* : Maldives, Sri Lanka, East Africa to Western Polynesia.

### 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

1798. *Harpa amouretta* Roeding, *Museum Boltenianum* : 150 (refers to Martini *Conch. Cab.*, 3: 421, pl. 119, fig. 1097, (Type locality : Amboina).

1973. *Harpa amouretta* : Rehder, *Indo-Pacif. Mollusca*, 3 (16) : 240, pl. 183, 189, figs. 6-11; pl. 211.

*Material* : 2 exs. Kavaratti: Coll. B.P.H., 27.3. 1984 & 5.4.1984; 1 ex., Minicoy: Col. D.R.K.S., 17.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands, Tranquebar. *Elsewhere* : Maldives, Sri Lanka, South Africa to Marquesas Islands in the Indo-Pacific.

## Family XXXI CANCELLARIIDAE

Genus 63. *Cancellaria* Lamarck, 1799103. *Cancellaria* sp.

*Material* : Minicoy: 1 ex., Coll. D.R.K.S., 17.2.1986.

*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, 1801104. *Marginella angustata* Sowerby

1846. *Marginella angustata* Sowerby, *Thesaurus Conchyliorum*, 1 *Marginella*, figs. 169-170.

1952. *Marginella angustata* : Satyamurti, *Bull. Madras Govt. Mus. new Ser.*, 1 (2) pt. 6 : 199, pl. 19, fig. 5a-b.

*Material* : Kavaratti: 1 ex., Coll. B.P.H., 5.4.1984; Agatti: 1 ex., Coll. B.P.H., 5.4.1984.

*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, 1798Subgenus *Nebularia* Swainson, 1840105. *Mitra (Nebularia) aurantia aurantia* (Gmelin)

1979. *Voluta aurantia* Gmelin, *Syst. Nat.*, ed. 13 : 3454 (refers Chemnitz figs, 1393, 1394; Type locality : Not given).

1984. *Mitra (Nebularia) aurantia aurantia* : Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 11, figs. 1-3.

*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

1844. *Mitra chrysalis* Reeve, *Proc. zool. Soc. Lond.*, (1844) pt. 12 : 185; 1844, *Conch. Icon.*, 2, *Mitra*, sp. 200, pl. 25, fig. 200 (Type locality : Not given).

1984. *Mitra (Nebularia) chrysalis* : Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 13, fig. 2.

*Material* : Kavaratti: 12 exs.; Coll. B.P.H., 30.3.1984; 4 exs., Coll. D.R.K.S., 9.2.1986; Kadmat: 5 exs., Coll. B.P.H., 11.4.1984; Minicoy: 8 exs., Coll. D.R.K.S., 15 & 19.2.1986.

*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

1811. *Mitra cucumerina* Lamarck, *Ann. Mus. d' His. Nat. Paris*, 17 : 215 (Type locality : Not given).

1906. *Mitra (Chrysame) cucumerina* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Lacadive Archipelagos*, 2 : 604.

1984. *Mitra (Nebularia) cucumerina* : Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 17, pl. 1, fig. 10.

*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.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands, Madras. *Elsewhere* : Maldives, Red Sea to Polynesia and Hawaiian Islands (Cernohorsky, 1976).

108. *Mitra (Nebularia) tabanula* Lamarck

1811. *Mitra tabanula* Lamarck, *Ann. Mus. d'Hist. Nat. Paris*, 17 : 222, no. 79 (Type locality : Great Indian Ocean).

1984. *Mitra (Nebularia) tabanula* : Subba Rao and Dey, *Rec. zool. Surv. India occ. Paper*, 61 : 20, pl. 2, fig. 20.

*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

1845. *Mitra turgida* Reeve, *Conch. Icon.*, 2, *Mitra*, sp. No. 273 : pl. 33, fig. 273 (Type locality : Isle of Capul, Philippines).

1984. *Mitra (Nebularia) turgida* : Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 21, fig. 4.

*Material* : Kavaratti: 7 ex., Coll. B.P.H., 29.3.1984; Agatti: ex., Coll. B.P.H., 5.4.1984.

*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* Prasad 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, 1840110. *Mitra (Strigatella) acuminata* Swainson

1832. *Mitra acuminata* Swainson, *Zoological Illustrations*, (2) 3, pl. 128, fig. 3.

1984. *Mitra (Strigatella)acuminata* : Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 24, pl.2, fig. 16.

*Material* : Agatti: 1 ex., Coll. B.P.H., 6.4.1984; Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Kavaratti: 6 exs., Coll. D.R.K.S., 7-9.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 19.2.1986.

*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

1811. *Mitra litterata* Lamarck, *Ann. Mag. d'Hist. Nat. Paris*, 17 : 220 (Type locality : Indian Ocean).  
 1903. *Mitra (Strigatella) litterata* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, 2 : 604.  
 1984. *Mitra (Strigatella) litterata* : Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 25, fig. 5.

*Materials* : Kavaratti: 8 exs., Coll. B.P.H., 30.3.1984; 1 ex., D.R.K.S., 7.2.1986; Kadmat: 3 exs., Coll. B.P.H., 11.4.1984; Minicoy: 4 exs., Coll. D.R.K.S., 12-19.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Pamban, Andaman and Nicobar Islands. *Elsewhere* : Red Sea to Polynesia and Hawaiian Islands (Cernohorsky, 1976).

### 112. *Mitra (Strigatella) pellisserpentis pellisserpentis* Reeve

1844. *Mitra pellisserpentis* Reeve, *Proc. zool. Soc. Lond.*, Pt. 12 : 172 (Type locality : Islands of Mindoro and Bohol, Philippines); *Conch. Icon.*, 2, *Mitra*, sp. 66, pl. 10, fig. 66.  
 1984. *Mitra (Strigatella) pellisserpentis pellisserpentis* : Subba Rao and Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 28, fig. 6.

*Material* : Androth: 1 ex., Coll. G.C.R., 22.2.1983; Kavaratti: 1 ex., Coll. B.P.H., 27.3.1984; Minicoy: 1 ex., Coll. D.R.K.S., 19.2.1986.

*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, Andamans. *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").  
 1984. *Mitra (Strigatella) scutulata* : Subba Rao Dey, *Rec. zool. Surv. India Occ. Paper*, 61 : 29, pl. 2, fig. 21.

*Material* : Minicoy: 1 ex., Coll. D.R.K.S., 17.2.1986.

*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. *Conus aulicus* Linnaeus, *Syst. Nat.*, ed. 10 : 717, sp. 279 (Type locality : "Asia").

1979. *Rhizoconus aulicus* : Mallik, *Marine Geology*, 29 : 375, fig. 36 (fig. err. *Regiconus aulicus*)

**Materials** : Kalpeni: 1 ex., Coll. Mallik.

**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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Mauritius, Sri Lanka. Uncommon in Indo-Pacific region (Abbott and Dance, 1982).

##### 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).

1921. *Conus canonicus* : Homell, *Madras Fish Bull*, 14 (2) : 215.

**Material** : Kavaratti: 1 ex., Coll. D.R.K.S., 5.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Chagos; Indo-Pacific (Abbott and Dance, 1982).

##### 116. *Conus coronatus* Gmelin

1791. *Conus coronatus* Gmelin, *Syst. Nat.*, ed. 13 : 3389 (Type locality : Not given).

1906. *Conus minimus* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 602.

1978. *Conus coronatus* : Kohn, *J. nat. Hist.*, 12 : 308, figs. 10, 11 and 33.

**Material** : Androth: 3 exs., Coll. G.C.R., 22.2.1983; Minicoy: 2 exs., Coll. G.C.R., 15.3.1983; 1 ex., Coll. D.R.K.S., 15.2.1986; Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Kavaratti: 3 exs., Coll. B.P.H., 29 and 30.3.1984, 5.4.1984; 7 exs., Coll. D.R.K.S., 5-9.2.1986; Agatti: 1 ex., Coll. B.P.H., 6.4.1984.

**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.

**Distribution** : *India* : Lakshadweep, Okha, Ratnagiri, Mandapam, Krusadai Island, Shingle Island, Tuticorin, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Cagos. widely distributed throughout tropical Indo-pacific (Kohn, 1978.).

### 117. *Conus ebraeus* Linnaeus

1758. *Conus ebraeus* Linnaeus *Syst. Nat.*, ed. 10 : 715, sp. 268 (Type locality : India).

1906. *Conus ebraeus* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 601.

1980. *Conus ebraeus* : Subba Rao, *Rec. zool. Surv. India*, 77 : 44.

**Material** : Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Kavaratti: 3 exs., Coll. B.P.H., 30.3.1984, 10 exs., Coll. D.R.K.S., 5.2.1986; Minicoy: 4 exs., Coll. D.R.K.S., 15-17.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands, Gulf of Mannar. *Elsewhere* : Throughout tropical Indo-west Pacific and east wards to central America (Kohn, 1978).

### 118. *Conus emaciatu*s Reeve

1849. *Conus emaciatu*s Reeve, *Conch. Icon.*, 1. *Conus*, sp. 248, pl. 5, fig. 248 (Type locality : Philippine Islands.)

1980. *Conus emaciatu*s : Subba Rao, *Rec. zool. Surv. India*, 77 : 41.

**Material** : Kavaratti: 2 exs., Coll. B.P.H., 30.3.1984.

**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

1758. *Conus geographus* Linnaeus, *Syst. Nat.*, ed. 10 : 718, sp. 283 (Type locality : "Indiis").

1980. *Conus geographus* : Subba Rao, *Rec. zool. Surv. India*, 77 : 45.

*Material* : East coast, Minicoy: 1 ex., Coll. D.R.K.S., 12.2.1986.

*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

1758. *Conus litteratus* Linnaeus, *Syst. Nat.*, ed. 10 : 712, sp. 252 (Type locality : "Asiatic Ocean").

1980. *Conus litteratus* : Subba Rao, *Rec. zool. Suve. India*, 77 : 45.

*Material* : Kavaratti: 1 ex., Coll. B.P.H., 27.3.1984; 1 ex., Coll. D.R.K.S., 4.2.1986.

*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

1758. *Conus miles* Linnaeus, *Syst. Nat.*, ed. 10 : 713, sp. 255 (Type locality : India).

1979. *Rhizoconus miles* : Mallik, *Marine Geology*, 29 : 375, fig. 35.

1980. *Conus miles* : Subba Rao, *Rec. zool. Surv. India*, 77 : 46.

*Material* : Kalpeni: 1 ex., Coll. Mallik.

*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. *Elsewhere* : East Africa to Polynesia. Earlier records from Minicoy were by Hornell (1921) and Nagabhushanam and Rao (1972).

122. *Conus miliaris* Hwass in Bruguiere

1792. *Conus miliaris* Hwass in Bruguiere, *Encyclopede Methodique Vers.*, 1 (2) : 629.

1980. *Conus miliaris* : Subba Rao, *Rec. zool. Surv. India*, 77 : 47

*Material* : Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Minicoy: 1 ex., Coll. D.R.K.S., 19.2.1986.

*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

1792. *Conus musicus* Hwass in Bruguiere, *Encyclopede Methodique Vers*, 1 : 629.

1978. *Conus musicus* : Kohn, *J. nat. Hist.*, 12 : 317, figs. 14, 58.

*Material* : Kavaratti: 1 ex., Coll. D.R.K.S., 8.2.1986; Agatti: 1 ex., Coll. B.P.H., 4.4.1984.

*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.

*Distribution* : *India* : Lakshadweep, Shingle Island. *Elsewhere* : Maldives (as *C. ceylanensis* by Smith, 1906). Throughout tropical Indian Ocean (Kohn, 1978).

It is recorded from the east coast of India under the name of *C. pusillus* (Melvill & Standen, 1898).

### 124. *Conus rattus* Hwass in Bruguiere

1792. *Conus rattus* Hwass in Bruguiere, *Encyclopede Methodique vers*, 1 : 700 (Type locality : Coasts of America).

1921. *Conus rattus* : Homell, *Madras Fish Bull.* 14 (6) : 214.

1978. *Conus rattus* : Kohn, *J. nat. Hist.*, 12 : 321, fig. 64.

*Material* : Kadmat: 1 ex., Coll. B.P.H., 11.4.1984.

*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.

*Distribution* : *India* : Lakshadweep, Krusadai Island. *Elsewhere* : Maldives, Chagos Archipelago. Widely distributed throughout the tropical Indo-west pacific region (Kohn, 1978).

### 125. *Conus tulipa* Linnaeus

1758. *Conus tulipa* Linnaeus, *Syst. Nat.* ed. 10 : 717, sp. 282 (Type locality : Not given).

1906. *Conus tulipa* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 602.

*Material* : Kavaratti: 2 exs., Coll. D.R.K.S., 9.2.1986.

*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).

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Anna Island in Pacific Ocean. Shallow waters in Indo-Pacific.

### 126. *Conus virgo* Linnaeus

1758. *Conus virgo* Linnaeus, *Syst. Nat.*, ed. 10 : 713, sp. 253 (Type locality : Not given).

1979. *Lithoconus virgo* : Mallik, *Marine Geology*, 29 : 375.

**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.

**Distribution** : *India* : Lakshadweep (Minicoy-Hornell, 1921), Bombay, Pondicherry, Mandapam, Tuticorin, Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in the tropical Indo-Pacific region (Kohn, 1978).

## Family XXXV TEREBRIDAE

### Genus 67. *Terebra* Bruguiere, 1729

### 127. *Terebra affinis* Gray

1834. *Terebra affinis* Gray, *Proc. zool. Soc. Lond.*, 1834 : 60.

1906. *Terebra (Myurella) affinis* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 2 : 603.

1967. *Terebra affinis* : Cernohorsky, *Marine shells of the Pacific*, 1 : 195, pl. 49, fig. 349.

**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 Cernohorsky (1967) and Abbott and Dance (1982) except in colouration.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives, Philippines, Fiji, Seychelles, throughout tropical Indo-Pacific (Cernohorsky, 1967).

### 128. *Terebra felina* (Dillwyn)

1817. *Buccinum felinum* Dillwyn, *Catalogue of Recent shells* : 644 (Type locality : not given).

1982. *Terebra felina* : Abbott and Dance, *Compendium of sea shells* : 273, fig.

*Material* : Agatti; 1 ex., Coll. B.P.H., 6.4.1984.

*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.

*Distribution* : *India* : Lakshadweep, Andamans. *Elsewhere* : West Indies, Seychelles. Throughout Indo-Pacific (Cernohorsky, 1967).

### 129. *Terebra maculata* (Linnaeus)

1758. *Buccinum maculatum* Linnaeus, *Syst. Nat.*, ed. 10 : 741, sp. 415, (Type locality : 'O. Africae' Asiae).

1906. *Terebra maculata* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, 2 : 602.

1967. *Terebra maculata* : Cernohorsky, *Marine shells of the Pacific*, 1 : 204, pl. 51, fig. 376.

*Material* : Minicoy: 1 ex., Coll. B.P.H., 20.12.1979; Agatti: 1 ex., Coll. B.P.H., 6.4.1984; Kavaratti: 1 ex., Coll. D.R.K.S., 22.2.1986.

*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 suture, earlier one broader than the latter; body whorl with three brown transverse bands; earlier whorls plicated axially. One of the shell found encrusted with epizoic shells, *Saptandanta nasika* Prasad and Rao on its spire.

*Distribution* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Maldives, throughout tropical Indo-Pacific (Cernohorsky, 1967; Abbott and Dance, 1982).

## 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 conchyliorum or Figures and descriptions of recent shells*, London, *Obeliscus*, sp. 807, pl. 171, fig. 34. (Type locality : Tahiti, Coral sand)

1906. *Obeliscus sulcatus* : Smith, In : Gardiner's *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, 2 : 617.

1972. *Pyramidella sulcata* : Cernohorsky, *Marine shells of the Pacific*, 2 : 200, pl. 57, fig. 2-2a.

*Material* : South end, Kalpeni: 1 ex., Coll. D.R.K.S., 22.2.1986; Minicoy: 2 exs., Coll. D.R.K.S., 14-18.2.1986, 2 exs. Coll. G.C.R., 11.3.1983.

*Measurements* : L. 14.32 - 22.50; W. 5.84 - 9.45

*Remarks* : Shell glossy, smooth, maculated with chocolate brown blotches.

*Distribution* : *India* : Lakshadweep (Minicoy, Hornell, 1921; Nagabhushanam and Rao, 1972). *Elsewhere* : Maldives. Tahiti. Indo-Pacific, moderately common in shallow waters to 10 m. (Abbott and Dance, 1982).

Order CEPHALASPIDEA

Family XXXVII ACTAeonIDAE

Genus 69. *Pupa* (Bolten) Roeding, 1798

131. *Pupa solidula* (Linnaeus)

1758. *Bulla solidula* Linnaeus, *Syst. Nat.*, ed. 10 : 728, sp. 346 (Type locality : Not given).

1906. *Solidula solidula* : Smith, In : Gardiner's *Fauna and Geography of the Maldives and Laccadive Archipelagoes*, 2 : 600.

1972. *Pupa solidula* : Cernohorsky, *Marine shells of the Pacific*, 2 : 203, pl. 58, figs. 1 1a,b.

*Material* : Minicoy: 1 ex., Coll. D.R.K.S., 14.2.1986; Kalpeni: 1 ex., Coll. D.R.K.S., 22.2.1986.

*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.

*Distribution* : *India* : Lakshadweep, Pamban, Krusadai Island. *Elsewhere* : Maldives, Indo-Pacific shallow water in sand (Abbott and Dance, 1982).

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).

*Material* : Kavaratti: 10 exs., Coll. D.R.K.S., 9.2.1986.

*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 Prasad, 1921

#### 133. *Indoplanorbis exustus* (Deshayes) (Plate III. Figs. 25 & 26)

1834. *Planorbis exustus* Deshayes, *Beleng. Voy. Ind. Orient. Zool.*; 417, pl. 1, figs. 11-13.

1980. *Indoplanorbis exustus* : Subba Rao, Das and Mitra, *Rec. zool. Surv. India*, 77 : pl. 3, fig. 10.

*Material* : Freshwater pond in Agriculture garden Kavaratti: 11 exs., Coll. D.R.K.S., 6.2.1986.

*Measurements* : L. 4.80 - 6.42; W. 7.35 - 12.46

*Remarks* : It is the most common freshwater snail of the main land 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 main land. *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)

1839. *Bulimus punctatus* Anton, *Verzeich. Conch.* : 42.

1903. *Rachis punctatus* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 145.

1979. *Rhachis punctatus* : Subba Rao and Mitra, *Rec. zool. Surv. India*, 75 : 11.

*Material* : From litter in Agricultural garden Kavaratti: 4 exs., Coll. D.R.K.S., 6.2.1986.

*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)

1834. No. 5, *Bulimus* : Hutton, *J. Asiat. Soc. Beng.*, 3 : 84; No. 5. *Bulimus* : (mihi) *gracilis* : 93 (Type locality : Mirzapore, Uttar Pradesh).  
 1903. *Opeas gracile* : Smith, In : Gardiner's *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 143.  
 1979. *Opeas gracile* : Subba Rao, and Mitra, *Rec. zool. Surv. India*, 75 : 12.

*Material* : Agricultural garden Kavaratti : 2 exs., Coll. D.R.K.S., 6.2.1986.

*Measurements* : L. 7.59 - 11.28; W. 2.85 - 3.22

*Distribution* : *India* : Lakshadweep, Andaman & Nicobar islands. Widely distributed in Indian main land. *Elsewhere* : Pakistan, Maldives, Sri Lanka, Bangladesh, Burma, Malaysia, China, Japan, Philippines and Polynesia.

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) cornigera* Sowerby

1869. *Aplysia cornigera* Sowerby, in Reeve's *Conch. Icon.* 17, *Aplysia*, sp. 40, pl. 9, fig. 40 (Type locality : Island of Zebu).  
 1952. *Aplysia cornigera* : Satyamurti, *Bull. Madras Govt. Mus. new Ser.*, 1 (2) pt. 6 : 223, pl. 23, fig. 1a-1f.

*Material* : Kavaratti: 2 exs., Coll. D.R.K.S., 5.2.1986.

*Measurements* : L. 17.17; W. 13.18 (Internal shell).

*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

1828. *Dolabella ecaudata* Rang, *Hist.Nat.Aplysiens, Paris* : 47, pl.2 (Type locality: Waigiou et. Rawack)  
 1944. *Dollabella ecaudata* : Eales, *Proc. malac. Soc. Lond.*, 26 : 5 figs. 7-8.

*Material* : Kavaratti: 1 ex., Coll. G.C.R., 19.3.1983.

**Distribution** : *India* : Lakshadweep; Andamans. It is the first record from these Islands.

Order SOLEOLIFERA

Family XLIII ONCHIDIDAE

The family includes marine slug. Single species under the genus *Onchidium* has been included.

Genus 76. **Onchidium** Buchanan, 1800

138. *Onchidium verruculatum* Cuvier

1830. *Onchidium verruculatum* Cuvier, *Le Regne Animal*, 2nd.ed. : 46.

1975. *Onchidium verruculatum* : Subba Rao and Mookherjee, *Recent Researches in Estuarine Biology*, ed. Natarajan : 172.

**Material** : Agatti: 2 ex., Coll. B.P.H., 6.4.1984.

**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.

**Distribution** : *India* : Lakshadweep. Common on Indian coast. *Elsewhere* : Widely distributed in Indo-Pacific region from Red sea to New Caledonia and Japan to Australia.

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

1819. *Arca avellana* Lamarck, *Anim. sans. Vert.*, 6 : 38.

1932. *Arca (Navicula) avellana* : Prashad, *Siboga Exped., Pelecypoda*, 53C (2) : 32.

**Material** : Kavaratti: 3 exs., Coll. B.P.H., 5.4.1984; 5 exs., Coll. D.R.K.S., 7-9.2.1986; Kadmat: 1 ex., Coll. B.P.H., 11.4.1984; Agatti: 3 exs., Coll. B.P.H., 4-8.4.1984; Minicoy: 4 exs., Coll. D.R.K.S., 12-19.2.1986.

**Measurements** : L. 11.85 - 39.92; Ht. 7.65 - 26.35; T. 7.40 - 25.00

**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.

*Distribution : India* : Lakshadweep, Veraval in Gulf of Kutch, Bombay, Rameswaram, Pamban, Krusadai Island, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

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).

1982. *Barbatia amygdalumtostum* : Abbott and Dance, *Compendium of Sea shells* : 293, fig.

*Material* : Agatti: 2 exs., Coll. B.P.H., 4-8.4.1984; Minicoy: 1 Valve, Coll. D.R.K.S., 15.2.1986.

*Measurements* : L. 9.30-22.35; Ht. 5.20-7.65; T. 4.35-9.40.

*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.

*Distribution : India* : Lakshadweep, Gulf of Kutch, Pamban, Krusadai and Shingle Islands, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific (Abbott and Dance, 1982).

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 Chernitz, *Conchy Cab.* 11, 244, pl. 204, fig. 2008).

1932. *Acar (Acar) plicata* : Prashad, *Sibozza Exped. Pelecypoda* 53c (2) : 50.

1956. *Acar plicata* : Satyamurti, *Bull. Madras Govt. Mus. new ser.*, 1 (2) pt 7 : 24.

1973. *Acar plicata* : Bigs, *Bull. Br. Mus. (Nat. Hist.)*, 24(8) : 376

*Material* : Kavaratti: 3 exs., Coll. B.P.H., 30.3.1984.

*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*.

*Distribution : India* : Lakshadweep, Pamban, Shingle Island, Andamans. *Elsewhere* : Widely distributed in Indo-Pacific.

It is recorded for the first time from these Islands.

Order MYTILIDAE

Family XLV MYTILIDAE

Genus 80 **Modiolus** Lamarck, 1799

142. *Modiolus philippinarum* (Hanley)

1844. *Modiola philippinarum* Hanley, *Proc. zool. Soc. Lond.*, (1844), pt. 7; 15, fig. 26 (Type locality : Zebu, Philippines).

1932. *Modiolus (Modiolus) philippinarum* : Prashad, *Siboga Exped. Pelecypoda*, 53c : 72.

*Material* : Kavaratti: 2 exs., Coll. D.R.K.S., 15.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 22.2.1986.

*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)

1850. *Avicula fucata* Gould, *Proc. Boston Soc. nat. Hist.*, 3 : 309.

1974. *Pinctada fucata* : Virabhadra Rao and Satyanarayana Rao, *Bull. Cent. mar. Fish. Res. Inst.*, 25 : 84, fig. 8A-E.

*Material* : Kalpeni: 2 exs. (Juvenile shells), Coll. D.R.K.S., 22.2.1986.

*Measurements* : L. 8.78 - 23.80; Ht. 9.45 - 24.25; T. 3.20 - 6.00

*Distribution* : *India* : Lakshadweep, Pirotan Island in Gulf of Kutch, Gulf of Mannar, Tuticorin, Krusadai Island, Visakhapatnam, andaman and Nicobar Islands. *Elsewhere* : Sri Lanka, Red Sea, Perisian Gulf, Indo-West Pacific.

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).

*Material* : Kavaratti: 1 ex., Coll. D.R.K.S., 9.2.1986; Agatti: 1 valve, Coll. B.P.H., 6.4.1984; Kavaratti: 6 valves, Coll. B.P.H., 2.1.1980.

*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).

**Material** : Kavaratti: 1 lower valve, Coll. B.P.H., 1.2.1980; 1 ex., Coll. B.P.H., 30.3.1984.

**Measurements** : L. 26.40-36.70; Ht. T. 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.

**Distribution** : *India* : Lakshadweep, Andamans. *Elsewhere* : Philippines.

## Family XLVIII OSTREIDAE

Genus 83 *Saccostrea* Dollfus and Dautzenberg, 1920146. *Saccostrea cucullata* (Born)

1778. *Ostrea cucullata* Born, *Index Rerum Naturalium Musei Cascarei Vindobonensis* : 100.

1780. *Ostrea cucullata* : Born, *Testacea Musei Caesarei Vindobonensis* : 114 pl. 6, figs. 11, 12 (Type locality : "Indies and Ascesion Island").

1975. *Saccostrea cucullata* : Ahmed, *Advances in Marine Biology*, 13 : 381.

**Material** : Kavaratti: Fishery jetty; 8 exs., Coll. D.R.K.S., 1986.

**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 it 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.

**Distribution** : *India* : Lakshadweep. Common on the Indian coast, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

Genus 84 *Crassostrea* Sacco, 1897147. *Crassostrea rivularis* (Gould)

1861. *Ostrea rivularis* Gould, *Proc. Boston Soc. nat. Hist.*, 8 : 39 (Type locality : China).

1971. *Crassostrea rivularis* : Ahmed, *Pakistan J. zool.* 3 (2) : 230, pl. 1, figs. 1-3.

**Material** : N.W. entrance of Lagoon, Kavaratti: 1 valve, Coll. B.P.H., 2.1.1980; Reef area, Minicoy: 8 exs., 3 valves., Coll. D.R.K.S., 15-17.2.1986; Kavaratti: 1 ex., Coll. D.R.K.S., 8.2.1986.

**Measurements** : L. 28.45 - 41.48; Ht. 35.70 56.70; T. 14.15 - 19.18

**Description** : Shell some what 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.

**Distribution** : *India* : Lakshadweep, Bombay. *Elsewhere* : Pakistan, Fiji, New Zealand, China, Japan West coast of United States, East coast of Africa.

#### 148. *Crassostrea* sp.

**Material** : Minicoy: 1 ex., Coll. D.R.K.S., 19.2.1986.

**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)

1758. *Venus punctata* Linnaeus, *Syst. Nat.*, ed. 10 : 688 (Type locality : "O. Indico") sp. 116.

1972. *Codakia punctata* : Cemohorsky, *Marine shells of the Pacific*, 2 : 221, pl. 62, fig. 6.

**Material** : Kavarratti: 1 ex., Coll. B.P.H., 5.4.1984; 1 ex. and 3 valves, Coll. B.P.H., 2.1.1980; Kalpani and Pitti: 3 exs., Coll. D.R.K.S. 22.2.1986.

**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, grooves 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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

Genus 86 *Ctena* Moerch, 1861

#### 150. *Ctena bella* (Conrad)

1837. *Lucina bella* Conrad, *J. Acad. Nat. Sci. Philadelphia*, 7(2) : 254, pl. 19, fig. 11. (Type locality: San Diego)

1921. *Lucina (Codakia) bella* : Homell, *Madras Fish., Bull.*, 14 (6) : 214.

1982. *Ctena bella* : Abbott and Dance, *Compendium of sea shells* : 321, fig.

**Material** : Kavaratti: 3 valves, Coll. B.P.H., 2.1.1980; Agatti: 2 exs., Coll. B.P.H., 5-6.4.1984; Minicoy: 1 ex., Coll. D.R.K.S., 12.2.1986; Southern end of Kalpeni and Pitti: 1 ex., Coll. D.R.K.S., 22.2.1986.

**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.

**Distribution** : *India* : Lakshadweep. *Elsewhere* : Indo-Pacific.

Family L CHAMIDAE

Genus 87 *Chama* Linnaeus, 1768

Subgenus *Chama* S.str.

### 151. *Chama (Chama) isotoma* Conrad

1837. *Chama isotoma* Conrad, *J. Acad. Nat. Sci. Philadelphia*, 7 (2) : 256 (Type locality : "Island of Atooi")

1977. *Chama (Chama) isotoma* : Ray, *Contribution to the knowledge of the Molluscan Fauna of Maungmagan, Lower Burma* : 112.

**Material** : Minicoy: 1 ex., Coll. D.R.K.S., 15.2.1986.

**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.

**Distribution** : *India* : Lakshadweep. *Elsewhere* : Red sea. Wide range in the Indo-Pacific. (Prashad, 1932).

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).

**Material** : Agatti: 1 ex., (Juvenile), Coll. B.P.H., 4.4.1984; Kavaratti: 2 valves, Coll. D.R.K.S., 8.2.1986.

**Measurements** : L. 13.90; Ht. 12.20; T. 10.85 Right valves L. 13.14-29.55; Ht. 15.21 - 28.80

**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 Methodique*, vers. 1 : 404, pl. 223, fig. 6. (Type locality : Bengal).

1977. *Cardita (Cardita) variegata* : Ray, *Contribution to the knowledge of the Molluscan fauna of Maungmagan, Lower Burma*; 108.

*Material* : Kavaratti: 2 exs., Coll. B.P.H., 30.3.1984; 3 exs., valve, Coll. D.R.K.S., 8-9.2.1986; Minicoy: 2 exs., Coll. D.R.K.S., 15-19.2.1986.

*Measurements* : L. 15.95 - 36.55; Ht. 10.85 - 22.50; T. 9.60 - 27.15

*Description* : Shell some what thick, solid and oblong, sculptured with strong radial ribs, ribs scaly. Shell white with brown markings on its ribs.

*Remarks* : These are found in in shallow-water coral reefs, most of the shells found covered with coral encrustations.

*Distribution* : India : Lakshadweep, Gulf of Kutch, Ratnagiri, Pamban, Krusadai Island, Madras, Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in the Indo-Pacific region.

Family LII CARDIIDAE

Genus 89 *Ctenocardia* H. & A. Adams, 1857

154. *Ctenocardia fornicata* (Sowerby)

1840. *Cardium fornicatum* Sowerby, *Proc. zool. Soc. Lond.* (1840). 110.

1932. *Cardium (Ctenocardium) fornicatum* : Prashad, *Siboga Exped, Pelecypoda 53c* : 276.

*Material* : Minicoy: 43 exs., 9 valves, Coll. D.R.K.S., 14-16.2.1986.

*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).

*Distribution* : India : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in Indo-Pacific (Prashad, 1932).

## Family LIII TRIDACNIDAE

Genus 90 *Tridacna* Bruguiere, 1797Subgenus *Chamotrachea* Moersch, 1853155. *Tridacna (Chamotrachea) maxima* (Roeding)1798. *Tridachnes maxima* Roeding, *Museum Boltenianum* : 171, sp. 184 (Type locality : 'Mauritius' SD, Rosewater, 1965).1965. *Tridacna (Chamotrachea) maxima* : Rosewater, *Indo-Pacif. Mollusca* 1 (6) : 384, pls. 263-265, 267-269, 288-290.*Material* : Kavaratti: 2 exs., Coll. D.R.K.S., 6-8.2.1986.*Measurements* : L. 66.05 – 123.45; Ht. 39.32 – 81.15; T. 29.36 – 60.21.*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* Deshayes1846. *Mactra luzonica* Deshayes, *Proc. zool. Soc. Lond.*, (1846) : 64, sp. 12 (Type locality : Luzon, Philippines).1977. *Mactra (Mactra) luzonica* : Ray, *Contribution to the knowledge of Molluscan fauna of Maungmagan, Lower Burma* : 135.*Material* : Minicoy, near Harbour Works : 2 valves, Coll. D.R.K.S., 16.2.1986.*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, 1895157. *Atactodea glabrata* (Gmelin)1791. *Mactra glabrata* Gmelin, *Syst. Nat.* ed. 13 : 3258, sp. no. 7 (Type locality : "Oceano Africano et. Indico")1921. *Mesodesma glabratum* : Hornell, *Madras Fish. Bull.*, 14 (6) : 214.

1982. *Atactodea striata* f. *glabrata* : Abbott and Dance, *Compendium of sea shells* : 339.

**Material** : Kavaratti: 6 exs., Coll. B.P.H., 31.3.1984; Minicoy: 26 exs., Coll. G.C.R., 15.3.1983; Southern and Kalpeni and Pitti: 10 exs., 3 valves, Coll. D.R.K.S., 22.2.1986; Minicoy: 3 valves, Coll. D.R.K.S., 15.2.1986.

**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 *Maetra* 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*.

**Distribution** : *India* : Lakshadweep, Pamban, Kundugal point, Krusadai Island, Shingle Island, Andaman and Nicobar Islands. *Elsewhere* : Sri Lanka, Aden, Mauritius, Australia, Indo-Pacific.

Family LVI DONACIDAE

Genus 93. *Donax* Linnaeus

Subgenus *Latona* Schumacher, 1817

158. *Donax (Latona) faba* Schroeter

1788: *Donax faba* : Schroeter, *Conch. Cab. Nomen Reg.* : 30. (Refers Chemnitz 1782, pl. 26, figs. 266, 267).

1986. *Donax (Latona) faba* : Subba Rao and Dey, *Rec. zool. Surv. India occ. paper*, 91 : 14, fig. 7, 32, 33.

**Material** : Minicoy: 6 exs. & 11 valves, Coll. D.R.K.S. 14-16.2.1986.

**Measurements** : L. 16.82 - 24.22; Ht. 13.15 - 18.96; T. 6.62 - 7.92.

**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)

1929. *Quidnipagus palatum* Iredale, *Mem. Qd. Mus.*, 9 : 266, (Refers to *Cochlea palatum* Martini, 1786, pl. 138.

1972. *Quidnipagus palatum* : Cernohorsky, *Marine shells of the Pacific* : 2 : 230, pl. 66, fig. 1.

**Material** : Minicoy: 4 valves, Coll. B.P.H., 10.12.1979; 8 valves, Coll. D.R.K.S., 16.2.1986.

**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).

**Distribution** : *India* : Lakshadweep, Bombay, Madras coast, Andaman and Nicobar Islands. *Elsewhere* : Widely distributed in Indo-Pacific.

### 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* : Cernohorsky, *Marine shells of the Pacific*, 2 : 229, pl. 65, fig. 5.

**Material** : N.W. entrance of lagoon, Kavaratti: 1 valve, Coll. B.P.H., 2.1.1980 (Dredge sample); Southern end, Kalpeni and Pitti: 1 valve, Coll. D.R.K.S., 22.2.1986.

**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.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Red Sea to Hawaii Islands.

### 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).

1952. *Tellina remies* : Dodge, *Bull. An. Mus. nat. Hist.* 100 : 49.

**Material** : Kavaratti : 1 ex., (Juvenile), Coll. D.R.K.S., 8.2.1986.

**Measurements** : L. 18.95; Ht. 17.25; T. 7.74

**Remarks** : Shell semi-orbicular in shape, sculptured with fine concentric ribs.

**Distribution** : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Sri Lanka, Indonesia, Philippines, East Australia.

### Subgenus *Arcopaginula* Lamy, 1918

#### 162. *Tellina (Arcopaginula) inflata* Gmelin

1791. *Tellina inflata* Gmelin, *Syst. Nat.*, ed. 13 : sp. no. 8. 3230.

1973. *Tellina (Arcopaginula) inflata* : Biggs, *Bull. Br. Mus. nat. Hist. (Zool.)*, 24 (8) : 404, fig. 10.

*Material* : N.E. entrance of lagoon, Kavaratti: 1 valve, Coll. B.P.H., 2.1.1980.

*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) reticulata* (Sowerby)

1867. *Tellina reticulata* Sowerby, Conch. Icon. 17, Tellina, sp. no. 252, pl. 43, fig. 252, (Type locality : not given).

*Material* : N. E. entrance of lagoon, Kavaratti: 4 valves, Coll. B.P.H., 2.1.1980; Minicoy: 1 exs., 1 valve, Coll. D.R.K.S., 18.2.1986.

*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 LVIII PSAMMOBIIDAE

Genus 96. *Asaphis* Modeer, 1793

164. *Asaphis violascens* (Forsk.)

1921. *Asaphis deflorata* : Hornell, *Madras Fish.*, Bull. 14 (6) : 214.

1972. *Asaphis violascens* : Cernohorsky, *Marine shells of the Pacific*; 2 : 231, pl. 66, fig. 7.

*Material* : Minicoy: 2 valve, Coll. B.P.H., 10.12.1979; 1 valve, Coll. D.R.K.S., 17.2.1986; Southern end Kalpeni and Pitti: 3 valve, Coll. D.R.K.S., 22.2.1986.

*Measurements* : L. 22.64 - 45.80; Ht. 18.20 - 45.80

*Description* : Shell oblong, large, solid, sculptured with numerous coarse radial ridges, fine concentric striae, ridges more scaly towards anterior and posterior parts; anterior adductor muscle more elongate than posterior, pallial sinus deep, tongue shaped, colour white, ornamented with violet rays and bands, beak stained with rosy violet; interior white, violet on anterior and posterior margins as well as hinge margin.

*Remarks* : It is very close to *Asaphis deflorata* (Linnaeus) from S.E. Florida and West Indies and often confused with it. It differs from it in having thick shell, coarse radial sculpture, pallial sinus broader and less deep than former.

*Distribution* : *India* : Lakshadweep, Andaman and Nicobar Islands. *Elsewhere* : Indo-Pacific.

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).

1976. *Gafrarium pectinatum* : Fischer Piette, *Rec. zool. Surv. India*, 70 : 236.

*Material* : Minicoy: 2 exs., 12 valves, Coll. D.R.K.S., 14-16.2.1986; Kalpeni and Pitti: 1 ex., Coll. D.R.K.S., 22.2.1986.

*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).

1976. *Marcia pinguis* : Fischer-Piette, *Rec. zool. Surv. India*, 70 ; 248.

*Material* : Minicoy: 1 valve, Coll D.R.K.S., 16.2.1986

*Measurements* : L. 30.45; Ht. 26.00

*Remarks* : It is very common in Indian backwaters.

*Distribution* : *India* : Lakshadweep, Coasts of India in river mouths and backwaters. *Elsewhere* : Persian Gulf, Gulf of Aden, Sri Lanka, Burma, Philippines, Australia.

Genus 99. *Timoclea* Brown, 1827

167. *Timoclea scabra* (Hanley)

1844. *Venus scabra* Hanley, *Proc. zool. Soc. Lond.*, (1844) pt. 12, 161. (Type locality : Catabalonga, Philippines).

1977. *Timoclea scabra* : Ray, *Contribution to the knowledge of the Molluscan fauna of Maungmagan, Lower Burma* : 126.

*Material* : N.W. entrance of lagoon, Kavaratti: 2 valves, Coll. B.P.H., 2.1.1980 (Dredge sample).

*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.

*Distribution* : India : Lakshadweep, Pulicat, Madras, Krusadai and Shingle Island, Puri. *Elsewhere* : From Persian Gulf to Japan.

It is recorded for the first time from these Islands.

Order MYOIDA

Family LX GASTROCHAENIDAE

Genus 100. *Gastrochaena* Spengler, 1783

168. *Gastrochaena cuneiformis* Spengler

1783. *Gastrochaena cuneiformis* Spengler, *Guerin, Mag. Nat. Hist.*

1982. *Gastrochaena cuneiformis* : Abbott and Dance, *Compendium of Sea shells* : 370, fig.

*Material* : West coast reef area, Kavaratti: 1 ex., Coll. D.R.K.S., 9.2.1986; Minicoy: 1 ex., Coll. D.R.K.S., 12.2.1986.

*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), *Latirus 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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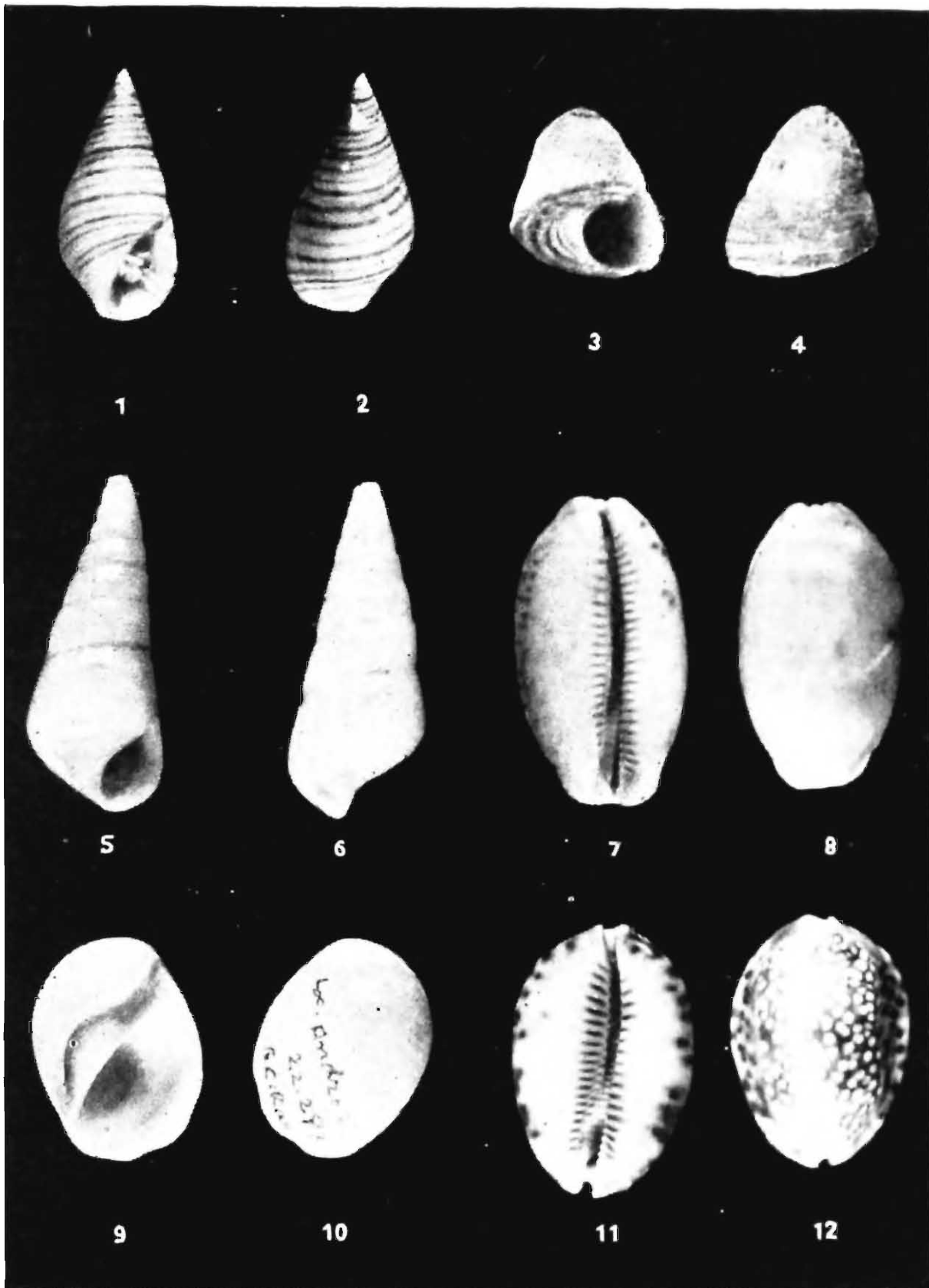
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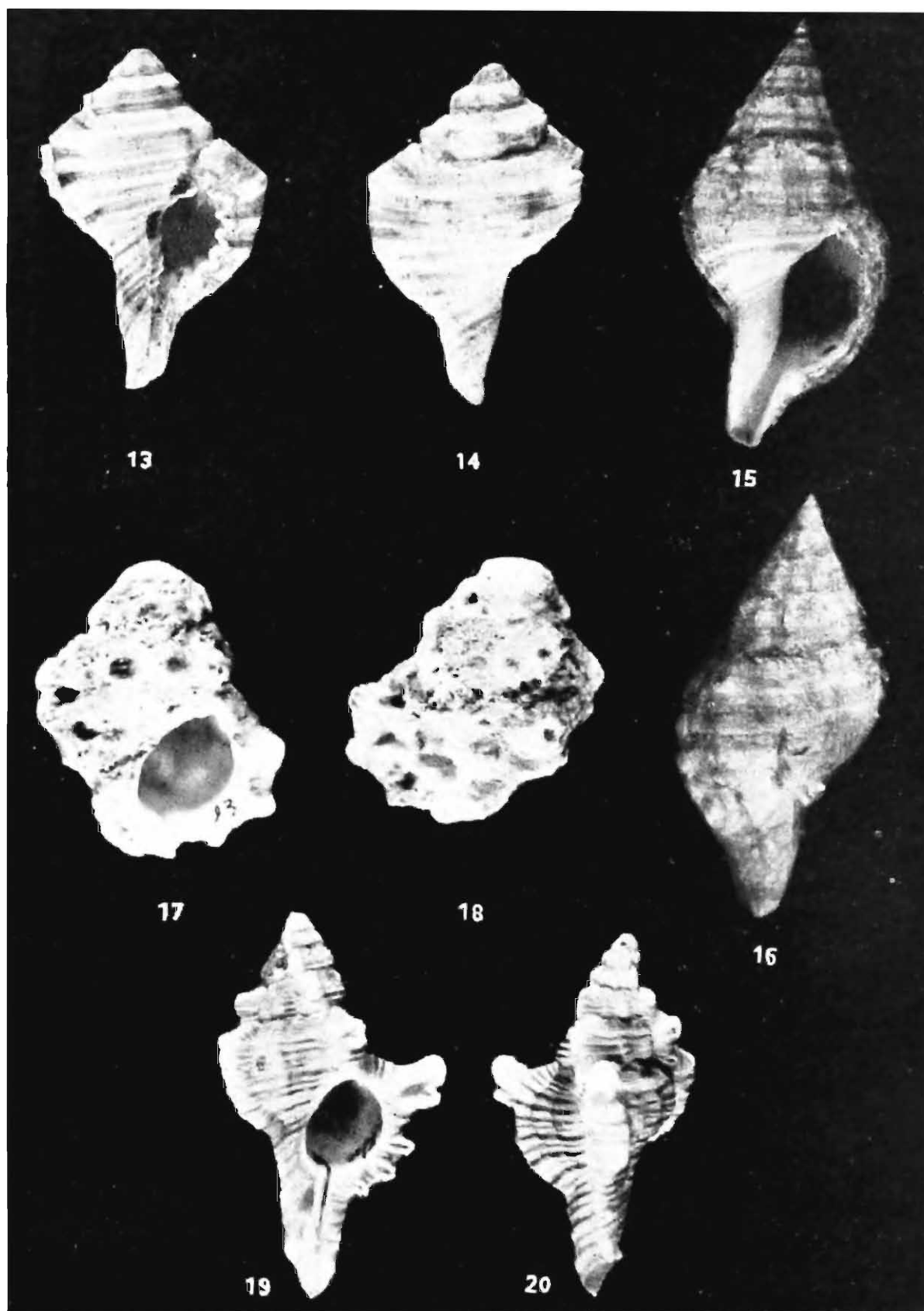
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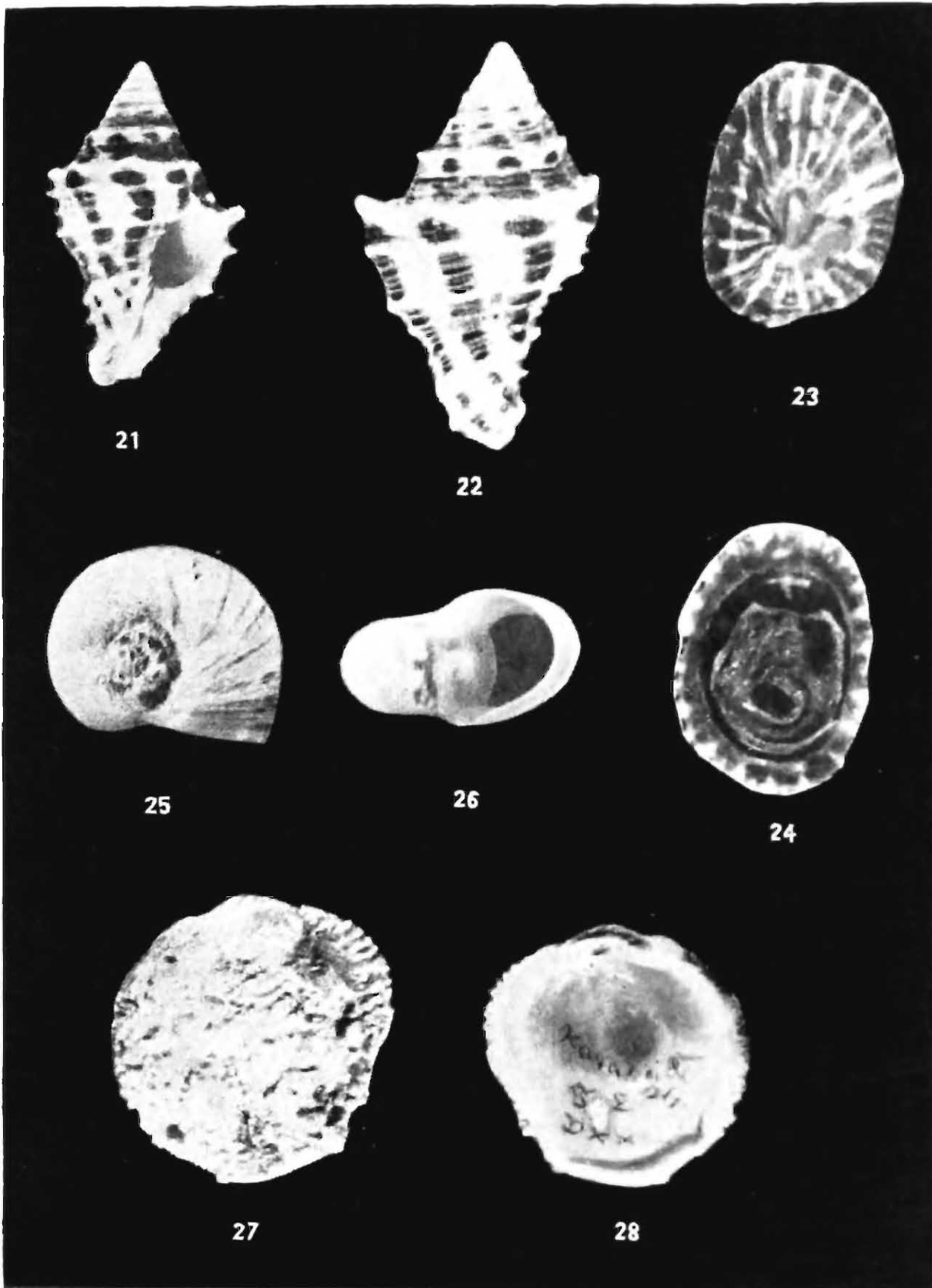
1 & 2. *Angiola lineata* (da Cosia) 8.40x3.92. (in mm.)      3 & 4. *Peaslella tantilla* (Gould) 3.12x2.80. (in mm.)      5 & 6. *Melanella inflexa* (Pease) 7.90x3.30.  
7 & 8. *Mauritia scurra* (Gmelin) 29.00x16.32      9 & 10. *Polinices maurus* (Lamarck) 21.55x17.45.      11 & 12. *Mauritia depressa* (Gray) 36.50x25.62



- 13 & 14. *Cymatium (Ranularia) sinense* (Reeve) 32.80x22.10.  
15 & 16. *Cymatium parthenopium* (Von Salis) 23.05x11.40.  
17 & 18. *Bursa creentata* (Sowerby) 28.18x23.30.  
19 & 20. *Chicoreus crocatus* (Reeve) 50.24 x 38.50.

SURYA RAO

PLATE III



21 & 22. *Latirus belcheri* (Reeve) 39.05 x 24.28.  
23 & 24. *Siphonaria funiculata* Reeve 9.85 x 6.95,  
25 & 26. *Indoplanorbis exustus* (Deshayes) 6.60 x 12.78.  
27 & 28. *Chama multisquamosa* Reeve 28.71 x 28.48.  
( Upper valve ]



**ECHINODERMATA : ASTEROIDEA, OPHIUROIDEA  
AND ECHINOIDEA**

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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 .....*Paraferdina 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 upto 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 upto 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 interradi-  
 areas..... *Tegulaster ceylanicus*

## SYSTEMATIC ACCOUNT

### 1. *Culcita novaeguineae* Mueller and Troschel

(Pl I, fig. 1)

1842. *Culcita novaeguineae* Mueller and Troschel, *Syst. Ast.*, 38

1969. *Culcita novaeguineae* var. *plana* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 52

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)

1806. *Asterias schmideliana* Retzius, *Diss. spec. Ast.*

1971. *Culcita schmideliana* : Clark and Rowe, *Monograph of shallow-water Indo west Pacific echinoderms*, 34, 53

*Material* : Agatti : Seven specimens, D.R.K. Sastry, 5,6.iv. 1984; Androth : Three specimens, B.P. Haldar, 20.xii.1979; Kavaratti : Two specimens, B.P. Haldar, 5.i.1980 and D.R.K. Sastry, 29.iii.1984; R = 25-120 mm.

*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)

1842. *Pentaceros regulus* Mueller and Troschel, *Syst Ast.*, 51

1969. *Protoreaster australis* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 52

1971. *Pentaceraster regulus* : Clark and Rowe, *Monograph of shallow water Indo west Pacific echinoderms*, 34, 55, 56

*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)

(Pl II, fig.9)

1816. *Asterias cylindricus* Lamarck, *Anim. s. vert.*, 2 : 567

1903. *Ophidiaster cylindricus* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 226

1969. *Dactylosaster cylindricus* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 53

*Material* : Agatti : Two specimens, B.P. Haldar, 27.xii.1979 and D.R.K. Sastry, 4.iv.1984; Kavaratti : Seven specimens, D.R.K. Sastry, 7-9.ii.1986; Minicoy : One specimen, D.R.K. Sastry, 19.ii.1986; R=25-80 mm

*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)

1840. *Ophidiaster leachi* Gray, *Ann. Mag. nat. Hist.*, 6 : 284

1969. *Leiaster leachi* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 53

1980. *Leiaster leachi* : Jangoux. *Rev. Zool. afr.*, 94 : 91

*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)

1840. *Linckia guildingi* Gray, *Ann. Mag. nat. Hist.*, 6 : 285

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 ]

1969. *Linckia laevigata* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 53

**Material** : Kavaratti : Six specimens, B. P. Haldar, 22.xii.1979, 4.i.1980 and D.R.K. Sastry, 29.iii.1984, 8,9.ii.1986; Minicoy : Four specimens, D.R.K. Sastry, 15,19.ii.1986; R = 40-140 mm

**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)

1816. *Asterias multifora* Lamarck, *Anim. s. vert.*, 2 : 565

1903. *Linckia multifora* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 226

1969. *Linckia multifora* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 53

**Material** : Agatti : 22 specimens, D.R.K. Sastry, 4-6.iv.1984; Kadamat : Three specimens, D.R.K. Sastry, 11.iv.1984; Kavaratti : 18 specimens, B.P. Haldar, 3,5.i.1980 and D.R.K. Sastry, 29.iii.1984, 7-9.ii.1986; Minicoy : Five specimens, D.R.K. Sastry, 19.ii.1986; R = 20-70 mm

**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. Adambulacrals 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

1976. *Paraferdina laccadivensis* James, *J. mar. biol. Ass. India*, 15 (1973) : 556

**Material** : Holotype : Minicoy, Z.S.I. 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)

1816. *Asterias carinifera* Lamarck, *Anim. s. vert.*, 2 : 556

1980. *Asteropsis carinifera* : Liao, *Stud. Mar. Sinica*, 17 : 155

**Material** : Agatti : One specimen, D.R.K. Sastry, 5.iv.1984; Kavaratti : Two specimens, D.R.K. Sastry, 9.ii.1986; Minicoy : One specimen, D.R.K. Sastry, 15.ii.1986; R = 43-70 mm

**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)

1840. *Asterina burtoni* Gray, *Ann. Mag. nat. Hist.*, 6 : 289

1971. *Asterina burtoni* : Clark and Rowe, *Monograph of shallow water Indo west Pacific echinoderms*, 38, 68

*Material* : Kavaratti : One specimen, D.R.K. Sastry, 5.ii.1986; Minicoy : 25 specimens, D.R.K. Sastry, 14.ii.1986; R = very small to 8 mm

*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)

1916. *Asterina leptalacantha* H.L. Clark, *Endeavour Sci. Res.*, 4 : 57

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 interradial regions - 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 upto 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 interradial regions leaving a large naked patch with only sacculate spines in four interradial regions 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 subambulacral 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)

1888. *Disasterina ceylanicus* Doederlein, *Zool. Jb.*, 3 : 825

1971. *Tegulaster ceylanicus* : Clark and Rowe, *Monograph of shallow-water Indo west Pacific echinoderms*, 38, 67

*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 spincllets, 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 interradial, 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. Inferomarginal 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 interradial; 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)

1758. *Asterias planci* Linnaeus, *Syst. Nat.*, 823

1969. *Acanthaster planci* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 54

*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. *Ophiiothrix (Ophiiothrix) trilineata* Luetken
8. *Ophiiothrix (Acanthophiothrix) purpurea* von Martens
- \*9. *Ophiiothrix (Acanthophiothrix) vigelandi* Clark
10. *Ophiiothrix (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.....*Ophiocomella sexradia*

- 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

1869. *Ophiomyxa australis* Luetken, K. dans. Vid. Selskr., 5 : 45, 99

1969. *Ophiomyxa australis* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 54

1971. *Ophiomyxa australis* : Clark and Rowe, *Monograph of shallow water Indo west Pacific echinoderms*, 78, 92

*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)

(Pl III, fig. 15)

1828. *Asterias squamata* Delle Chiaje, *Mem. anim. s. vert.*, 3 : 77

1978. *Amphipholis squamata* : Cherbonnier and Guille, *Faun. Madag.*, 48 : 105

*Material* : Androth : Two specimens, B.P. Haldar, 19.xii.1979; Kavaratti : 16 specimens, D.R.K. Sastry, 31.iii.1984; Minicoy : 15 specimens, B.P. Haldar, 13.xii.1979 and D.R.K. Sastry, 14.ii.1986; d.d. = very small to 2 mm

*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)

(Pl III, fig. 14)

1842. *Ophiolepis savignyi* Mueller and Troschel, *Syst. Ast.*, 95

1969. *Ophiactis savignyi* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 55

*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)

1861. *Ophiothrix demessa* Lyman, *Proc. Boston Soc. nat. Hist.*, 8 : 82

1968. *Macrophiothrix demessa* : Clark, *Bull. Br. Mus. nat. Hist. (Zool.)*, 16 : 289

*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)

1816. *Ophiura longipeda* Lamarck, *Anim. s. vert.*, 2 : 544

1968. *Macrophiothrix longipeda* : Clark, *Bull. Br. Mus. nat. Hist. (Zool.)* 16 : 300

*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; Minicoy : Three specimens, D.R.K. Sastry, 19.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 octagonal; 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)

1861. *Ophiothrix propinqua* Lyman, *Proc. Boston Soc. nat. Hist.*, 8 : 83

1980. *Macrophiothrix propinqua* : Clark, *Rev. Zool. afr.*, 94 : 537

*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)

1869. *Ophiothrix trilineata* Luetken, *K. dans. Vid. Selskr.*, 5 : 40, 82

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

1867. *Ophiothrix purpurea* von Martens, *Mber. dt. Akad. Wiss. Berl.*, 1867 : 346

1971. *Ophiothrix* (*Acanthophiothrix*) *purpurea* : Clark and Rowe, *Monograph of shallow-water Indo-west Pacific echinoderms*, 86, 112

*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

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 (Acanthophiothrix) vigelandi* Clark

(Pl IV, fig, 19)

1968. *Ophiothrix (Acanthophiothrix) vigelandi* Clark, *Bull. Br. Mus. nat. Hist. (Zool.)*, 16 : 277

*Material* : Minicoy : One specimen, B.P. Haldar, 12.xii.1979; d.d. = 3 mm

*Description* : Disc covered by short trifold 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)

1816. *Ophiura nereidina* Lamarck, *Anim. s. vert.*, 2 : 544

1903. *Ophiothrix nereidina* : Bell, in : *Fauna and Geography of the Maldiva and Laccadive Archipelagoes*, 1 : 229

1969. *Ophiothrix (Keystonea) nereidina* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 55

*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

1944. *Ophiocoma anaglyptica* Ely, *J. Wash. Acad. Sci.*, 34 : 373

1969. *Ophiocoma anaglyptica* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

*Remarks* : The species listed by James (1969) based on material from Chetlat, 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)

1851. *Ophiocoma brevipes* Peters, *Ber. K. Preurs. Akad. Wiss.*, 1851 : 466

1903. *Ophiocoma brevipes* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 228

1969. *Ophiocoma brevipes* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

**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 upto the distal border of the oral shields. Arms stout; dorsal arm plates ovate with rounded lateral margins and broader than long. Arm spines upto 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)

1842. *Ophiocoma dentata* Mueller and Troschel, *Syst. Ast.*, 99

1969. *Ophiocoma insularia* var. *variegata* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

1970. *Ophiocoma dentata* : Devaney, *Smithsonian Contributions to Zoology*, 51 : 13

**Material** : Agatti : Three specimens, D.R.K. Sastry, 5,6.iv.1984; Androth : Seven specimens, B.P. Haldar, 20.xii.1979; Kavaratti : 23 specimens, B.P. Haldar, 3,5.i.1980 and D.R.K. Sastry, 27.iii.1984, 5,6.ii.1986; Minicoy : Three specimens, D.R.K. Sastry, 17,19.ii.1986; d.d. = 4 - 20 mm.

**Description** : Disc granules rounded, uniformly covering the dorsal side and ventral interbrachial areas upto 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)

1842. *Ophiocoma erinaceus* Mueller and Troschel, *Syst. Ast.*, 98

1903. *Ophiocoma erinaceus* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 228

1969. *Ophiocoma erinaceus* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

**Material** : Agatti : Four specimens, B.P. Haldar, 27.xii.1979 and D.R.K. Sastry,

4.iv.1984; Kadamat : Two specimens, D.R.K. Sastry, 11.iv.1984; Kavaratti : 15 specimens, B.P. Haldar, 3,5.i.1980 and D.R.K. Sastry, 30.iii.1984, 5,7,9.ii.1986; Minicoy : Three specimens, B.P. Haldar, 11.xii.1979 and D.R.K. Sastry, 19.ii.1986; d.d. = 4-23 mm

**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)

1842. *Ophiocoma pica* Mueller and Troschel, *Syst. Ast.*, 101

1969. *Ophiocoma pica* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

**Material** : Kavaratti : Two specimens, D.R.K. Sastry, 5,6.ii.1986; Minicoy : Two specimens, D.R.K. Sastry, 17,19.ii.1986; d.d. = 4-13 mm

**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

1969. *Ophiocoma scolopendrina* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

**Material** : Kadamat : Three specimens, D.R.K. Sastry, 11.iv.1984; Minicoy : Three specimens, B.P. Haldar, 11.xii.1979 and D.R.K. Sastry, 15,19.ii.1986; d.d. = 16-23 mm.

**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

1842. *Ophiocoma valenciae* Mueller and Troschel, *Syst. Ast.*, 102

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)

1887. *Ophiocnida sexradia* Duncan, *J. Linn. Soc. Lond. (Zool.)*, 21 : 92

1969. *Ophiocomella sexradia* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

*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)

1816. *Ophiura annulosa* Lamarck, *Anim. s. vert.*, 2 : 543

1903. *Ophiomastix annulosa* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 229

1969. *Ophiomastix annulosa* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 56

*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

1860. *Ophionereis porrecta* Lyman, *Proc. Boston Soc. nat. Hist.*, 7 : 260

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 ECHINOIDA

## Family ECHINOMETRIDAE

8. *Echinometra mathaei* (de Blainville)
9. *Echinostrephus molaris* (de Blainville)
10. *Heterocentrotus mammillatus* (Linnaeus)

## Order HOLECTYPOIDA

## Family ECHINONEIDAE

11. *Echinoneus cyclostomus* Leske

## Order CLYPEASTEROIDA

## Family CLYPEASTERIDAE

12. *Clypeaster rarispinus* de Meijere

## Order SPATANGOIDA

## 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 mammillatus*
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)

1845. *Diadema savignyi* Michelin, *Mag. Zool. Paris (2) Zoophytes*, 1845 : 15

1969. *Diadema savignyi* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 58

**Material** : Agatti : One specimen, D.R.K. Sastry, 5.iv.1984; Kadamat : One specimen, D.R.K. Sastry, 11.iv.1984; Kavaratti : One specimen, D.R.K. Sastry, 29.iii.1984; D = 25-30 mm

**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)

1774. *Echinus calamaris* Pallas, *Spec. Zool.*, 1 : 31

1903. *Echinothrix desori* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 230

1971. *Echinothrix calamaris* : Clark and Rowe, *Monograph of shallow-water Indo west Pacific echinoderms*, 140, 153

**Material** : Agatti : One specimen, D.R.K. Sastry, 5.iv.1984; Androth : One specimen, B.P. Haldar, 20.xii.1979; Kavaratti : One specimen, D.R.K. Sastry, 6.ii.1986; Minicoy : Two specimens, D.R.K. Sastry, 17,19.ii.1986; D = 9-50 mm

**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)

1758. *Echinus diadema* Linnaeus, *Syst. Nat.*, 664

1903. *Echinothrix diadema* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 230

1969. *Echinothrix diadema* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 58

*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)

1816. *Echinus variolaris* Lamarck, *Anim. s. vert.*, 3 : 47

1969. *Stomopneustes variolaris* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 58

*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

1869. *Pseudoboletia maculata* Troschel, *Verh. Nat. ver. Rhenl. Westph*, 96

1969. *Pseudoboletia maculata* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 57

*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)

1758. *Echinus gratilla* Linnaeus, *Syst. Nat.*, 664

1903. *Tripneustes angulosa* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 231

1971. *Tripneustes gratilla* : Clark and Rowe, *Monograph of shallow-water Indo west Pacific echinoderms*, 142, 156

**Material** : Agatti : Five specimens, B. P. Haldar, 24.xii.1979 and D. R. K. Sastry, 5.iv.1984; Androth : One specimen, B. P. Haldar, 20.xii.1979; Bangaram : Six specimens, B. P. Haldar, 25,26.xii.1979; Kavaratti : Two specimens, G. C. Rao, 18.ii.1983; D = 65-80 mm

**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)

1825. *Echinus mathaei* de Blainville, *Dict. Sci. Nat.*, 37 : 94

1903. *Echinometra lucunter* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 231

1969. *Echinometra mathaei* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 58

**Material** : Agatti : Three specimens, D. R. K. Sastry, 5,6.iv.1984; Kadamat : One specimen, D. R. K. Sastry, 11.iv.1984; Kavaratti : Three specimens, D. R. K. Sastry, 29.iii.1984, 8,9.ii.1986; Minicoy : Four specimens, B. P. Haldar, 14.xii.1979 and D. R. K. Sastry, 17.ii.1986; L = 7-35 mm

**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)

1825. *Echinus molare* de Blainville, *Dict. Sci. Nat.*, 37 : 88

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 diameter 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)

1758. *Echinus mammillatus* Linnaeus, *Syst. Nat.*, 6671969. *Heterocentrotus mammillatus* : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 58*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)

1778. *Echinoneus cyclostomus* Leske, *Add. ad Klein*, 1091903. *Echinoneus cyclostomus* : Bell, in : *Fauna and Geography of the Maldive and Laccadive Archipelagoes*, 1 : 2321971. *Echinoneus cyclostomus* : Clark and Rowe, *Monograph of shallow water Indo west Pacific echinoderms*, 144, 158*Material* : Kavaratti : 10 specimens, B. P. Haldar, 3,5.i.1980 and D. R. K. Sastry, 9.ii.1986; Minicoy : Eight specimens, B. P. Haldar, 13.xii.1979 and D. R. K. Sastry, 17,19.ii.1986; L = 20-42 mm*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 : 71971. *Clypeaster rarispinus* : Clark and Rowe, *Monograph of shallow water Indo west Pacific echinoderms*, 144, 160*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)

1778. *Spatangus brissus* var. *latecarinatus* Leske, *Add. ad Klein*, 185

1971. *Brissus latecarinatus* : Clark and Rowe, *Monograph of shallow-water Indo west Pacific echinoderms*, 146, 165

*Material* : Minicoy : One specimen, D. R. K. Sastry, 19.ii.1986; L = 31 mm

*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)

1758. *Echinus spatagus* Linnaeus, *Syst. Nat.*, 665

1969. *Metalia spatangus* (sic.) : James, *Bull. cent. mar. Fish. Res. Inst.*, 7 : 59

1971. *Metalia spatagus* : Clark and Rowe, *Monograph of shallow water Indo west Pacific echinoderms*, 146, 166

*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 Maldivé 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 amphipod, *Amphipholis squamata* was most common in the turtle-grass beds and the ophiactid, *Ophiactis savingnyi* among sponges of the shingle beds and crevices. The ophiotrichid, *Macrophiothrix 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, *Ophiocoma 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 segregation 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 holactypoid, *Echinoneus cyclostomus* was always found in the crevices and more usually under the shingles. Only a single dead test of the spatangoid, *Brissus latecarinatus* 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 Lakshadweep 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.

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## 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

1. *Halityle regularis* Fisher, 1913. *Proc. U.S.natn.Mus.* 32 : 211

*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.

2. *Fromia indica* (Perrier) 1869. *Annl. Sci.nat.* 12 : 235

*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.

4. *Patiriella pseudoexigua* Dartnall, 1971. *Proc. Linn. Soc. N.S.W.* 96 : 43

*Remarks* : Asterinid of pentagonal form with interbrachial margin rigid and almost straight.

*Distribution* : Lakshadweep (Agatti). Tropical Indo - west Pacific north of 28°S Latitude.

5. *Cistina Columbiae* Gray, 1840. *Ann. Mag. nat. Hist.* 6 : 283

*Remarks* : Echinasterid with cylindrical arms and abactinal plates and their spines in regular longitudinal series.

*Distribution* : Lakshadweep (Chetlat) and Mauritius.

## OPHIUROIDEA

6. *Ophioelegans cincta* (Mueller and Troschel) 1842. *Syst.Ast.* 90

*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 *Ophioelegans* g.n. by James, 1987. *J.mar.biol.Ass.India*, 23 (1981) : 15-18

7. *Ophiolepis superba* H.L. Clark, 1915. *Spolia zeylan.* 10 : 89

*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

8. *Prionocidaris verticillata* (Lamarck) 1816. *Anim. s. vert.* 3 : 56

*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.

*Distribution* : Lakshadweep (Chetlat and Kiltan). East coast of Africa to Hawaiian Islands.

9. *Eucidaris metularia* (Lamarck) 1816. *Anim. s. vert.* 3 : 56

*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.

*Distribution* : Lakshadweep (Androth). East coast of Africa to Hawaiian Islands.

10. *Diadema setosum* (Leske) 1778. *Add. ad Klein*, 36

*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.

11. *Mespilia globulus* (Linnaeus) 1758. *Syst. Nat.* 664

*Remarks* : Temnopleurid with shallow gill slits, test plates with light coloured radiating striations and ten spineless vertical bare areas on the test.

*Distribution* : Lakshadweep (Kavaratti) to South Pacific Islands.

12. *Salmacis virgulata* L. Agassiz, 1816. *Annls Sci. nat.* (3)6 : 359

*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.

13. *Toxopneustes pileolus* (Lamarck) 1816. *Anim. s. vert.* 3 : 45

*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.

14. *Clypeaster reticulatus* (Linnaeus) 1758. *Syst. Nat.* 666

*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).

15. *Echinolampas alexandri* de Loriol, 1876. *Mem. Soc. Phys. Hist. Geneve*, 24 : 660

*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 fascioles) with oval peristome and few tubercles in the interporiferous zone of petals.

*Distribution* : Lakshadweep (Kiltan). Western Indian Ocean to South Pacific Islands.

16. *Echinolampas ovata* (Leske) 1778. *Add. ad Klein*, 127

*Remarks* : Differs from *E. alexandri* in having pentagonal peristome and crowded tubercles in a series in the interporiferous zone of petals.

*Distribution* : Lakshadweep (Amuni, Androth and Kiltan). Red Sea and Mascarene Islands to North Australia.

## 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.



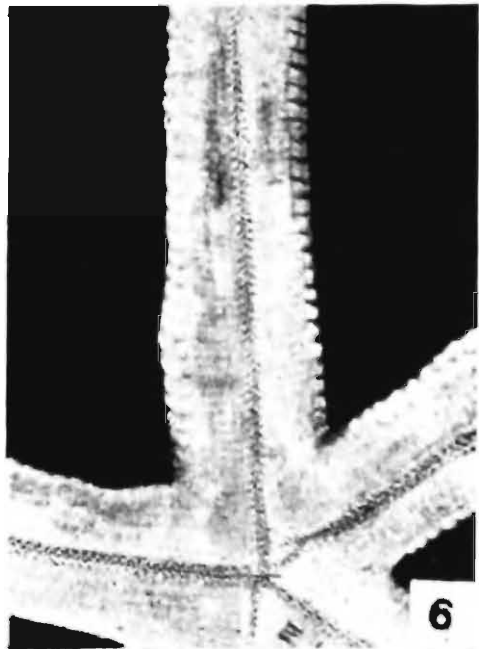
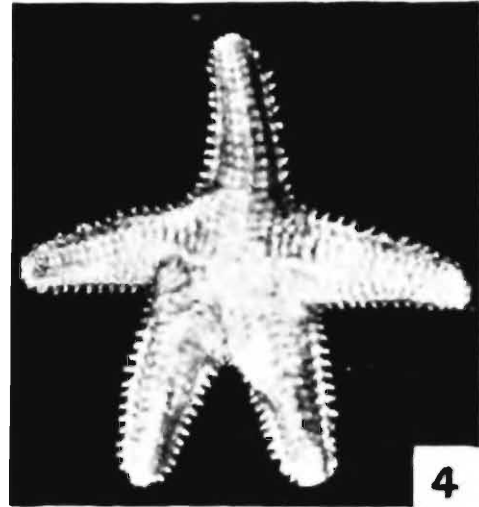
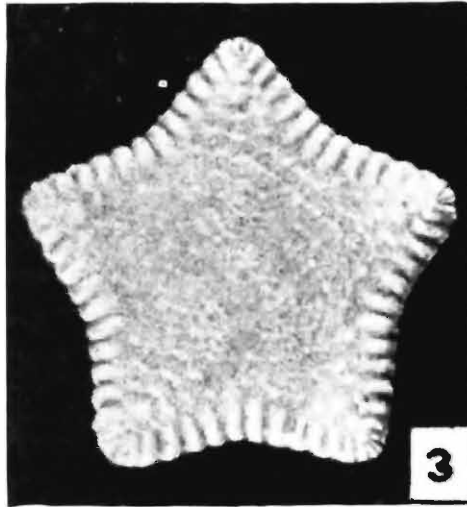
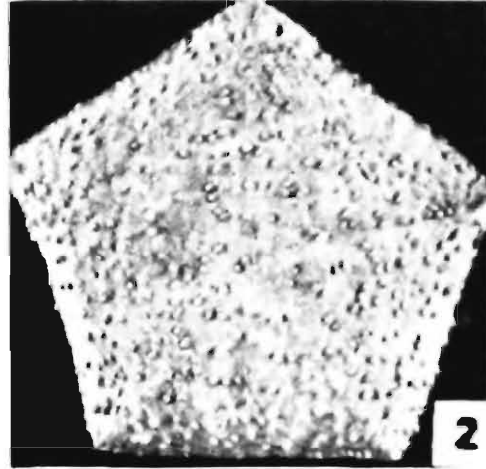
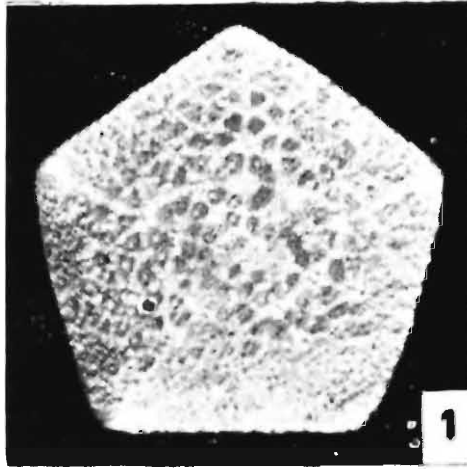
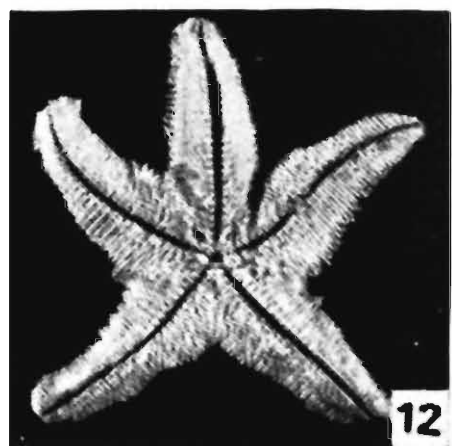
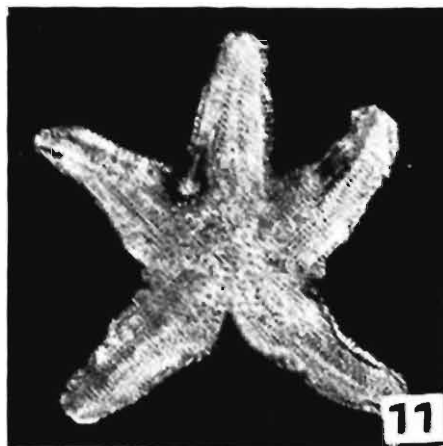
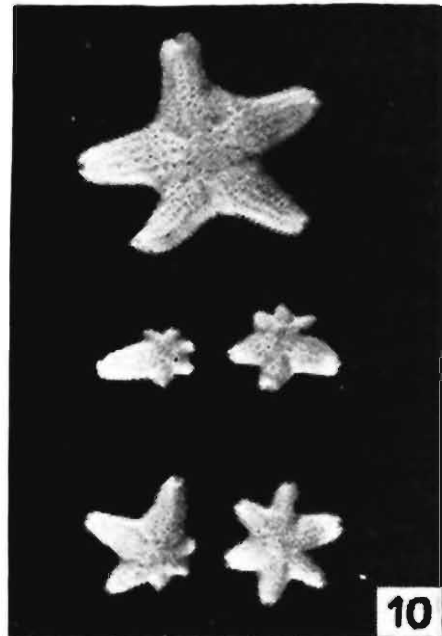
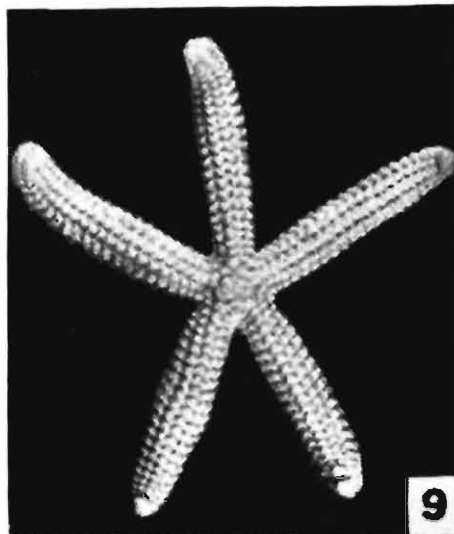
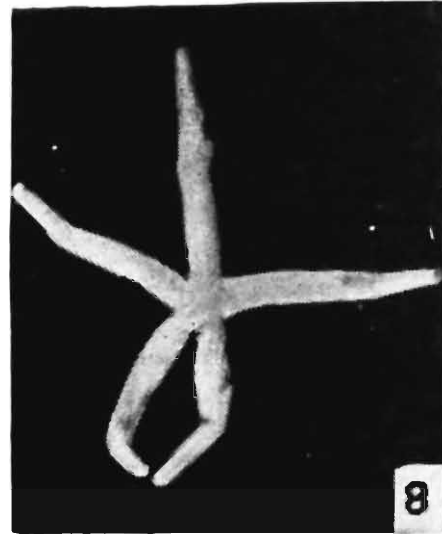
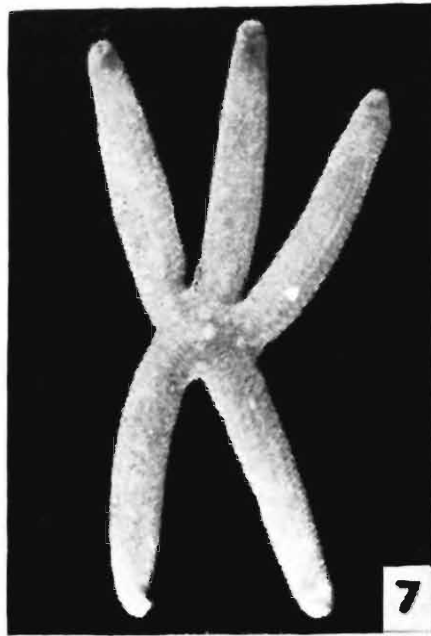


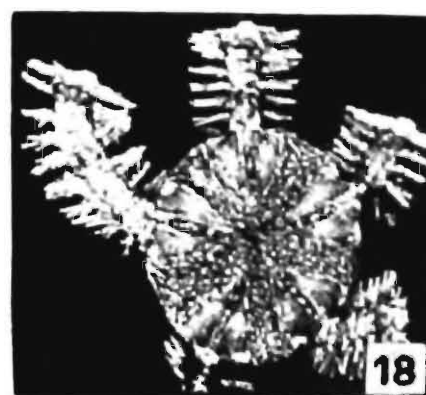
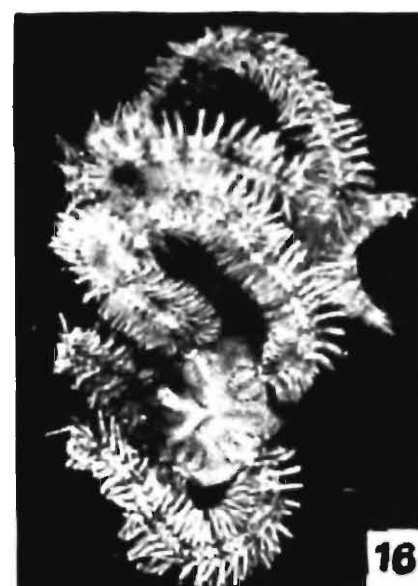
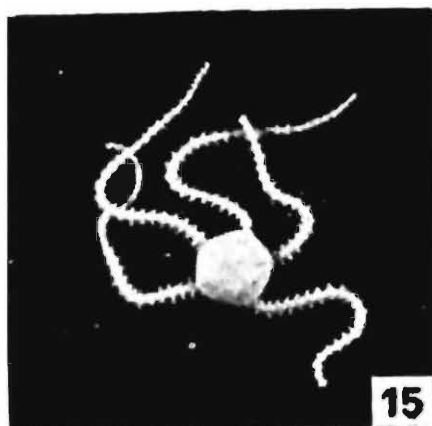
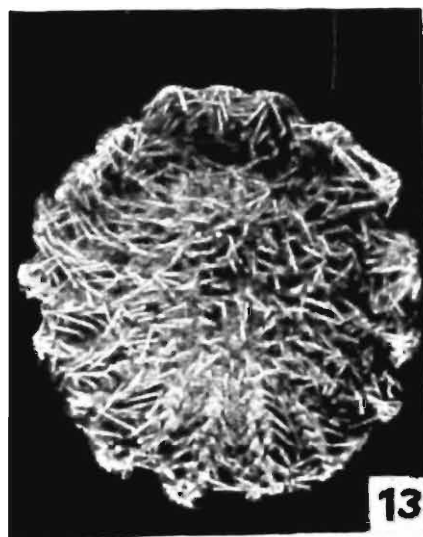
Fig. 1 *Culcita navaeguineae* : Agatti, R=65 mm. abactinal view  
Fig. 2. *Culcita schmideliana* : Androth R=60 mm. abactinal view  
Fig. 3. Same Kavaratti, R=70 mm, abactinal view  
Fig. 4. *Asteropsis carinifera* : Kavaratti, R=70 mm, abactinal view  
Fig. 5. *Linckia guildingi* : Agatti, R=175 mm, abactinal view  
Fig. 6. Same ; Part of actinal side enlarged

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PLATE II



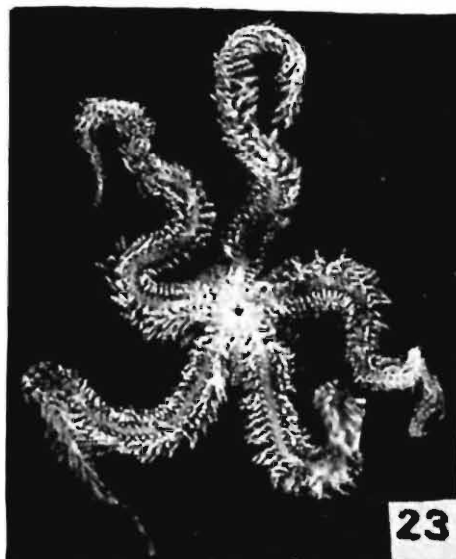
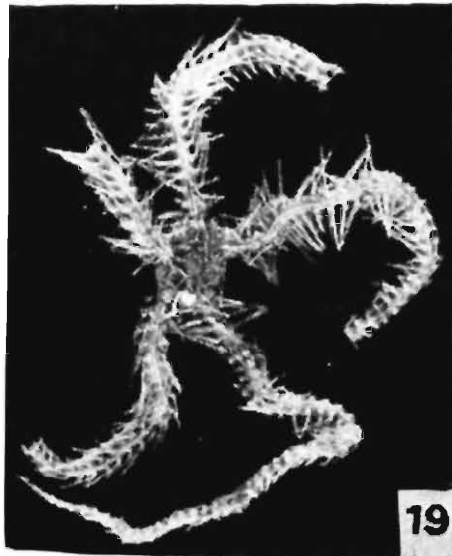
- Fig. 7. *Linckia laevigata* : Minicoy, R=75 mm, abactinal view  
Fig. 8. *Linckia multifora* : Agatti, R=50 mm, abactinal view showing protuberances containing parasitic gastropods  
Fig. 9. *Dactylaster cylindricus* : Agatti, R=25 mm, abactinal view  
Fig. 10. *Asterina burtoni* : Minicoy, R=8 mm 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. *Ophiactis savignyi* : Minicoy, d.d = 3 mm, dorsal view  
Fig. 15. *Amphipholis squamata* : Minicoy, d.d.=2 mm, dorsal view  
Fig. 16. *Macroshicthrix demessa* : Kava atti, d.d = 6.5 mm, dorsal view  
Fig. 17. *Macroshicthrix longipeda* : Minicoy, d.d.=20 mm dorsal view  
Fig. 18. *Macroshicthrix propinqua* : Agatti, d.e.=5.5 mm, dorsal view

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PLATE IV



- Fig. 19. *Ophiothrix (Acanthophiothrix) vigelandi* : Minicoy, d.d.=6 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.

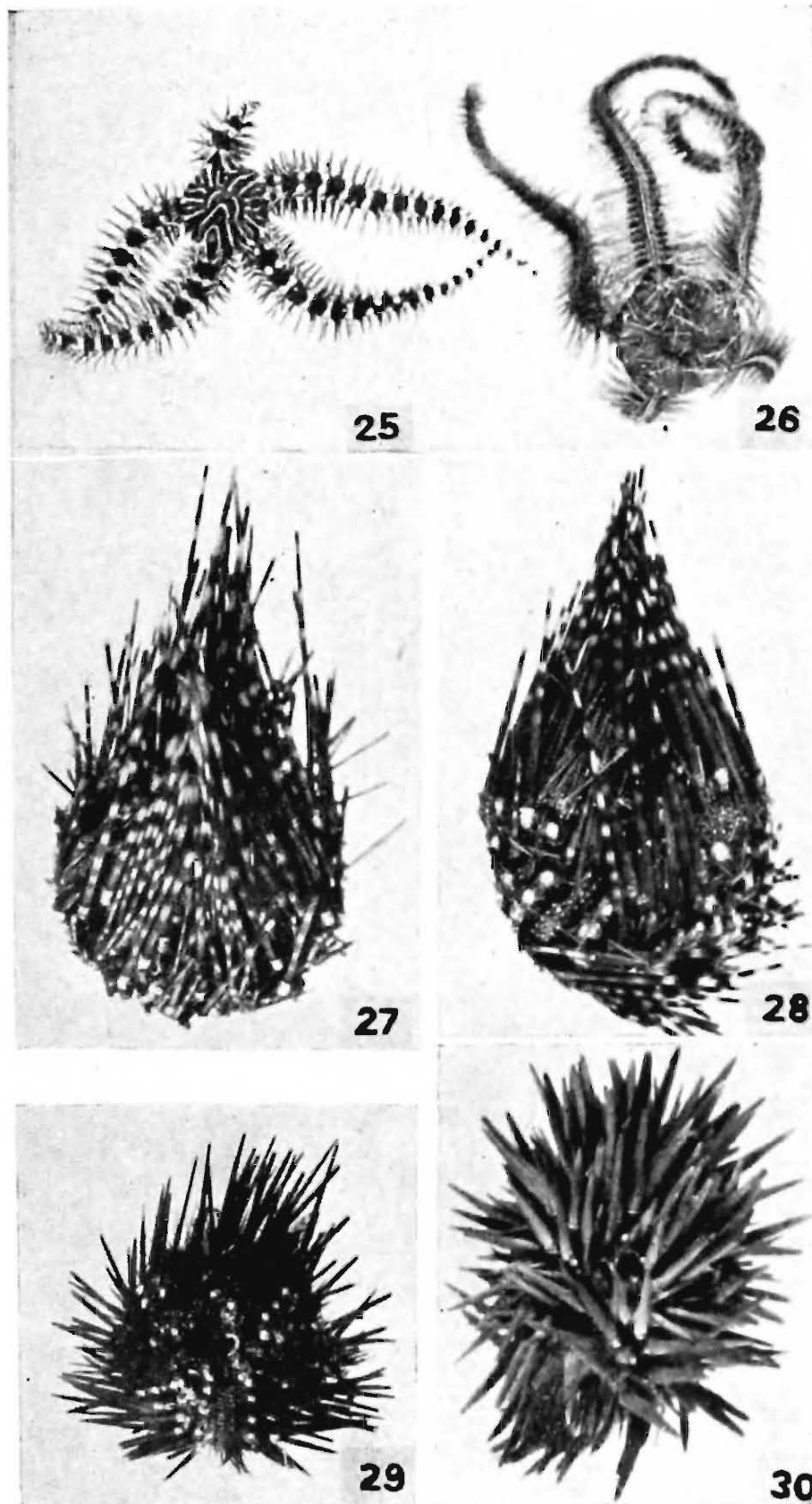
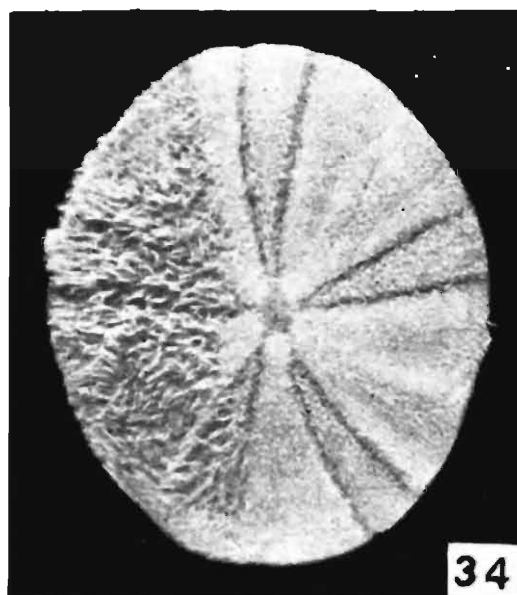
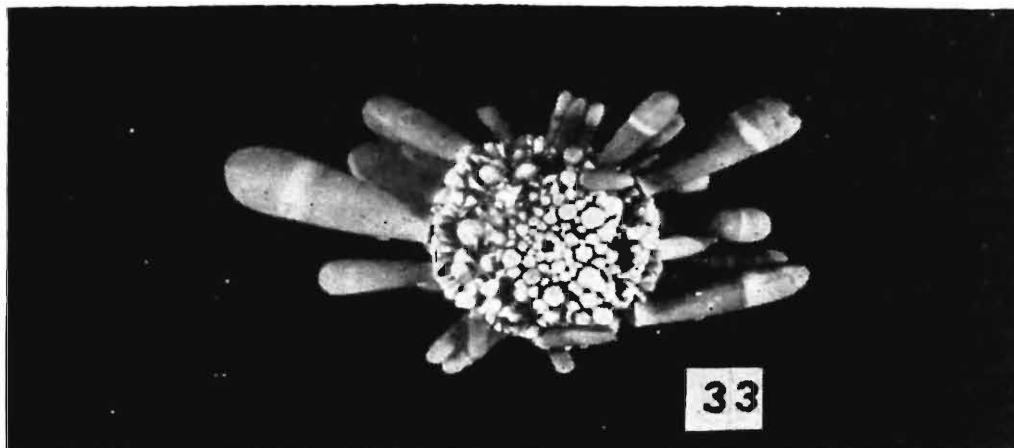
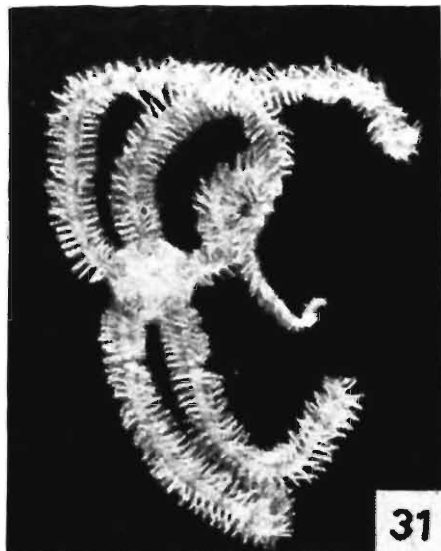


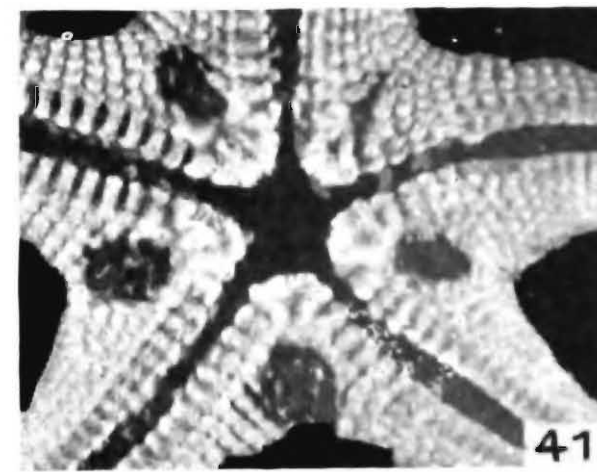
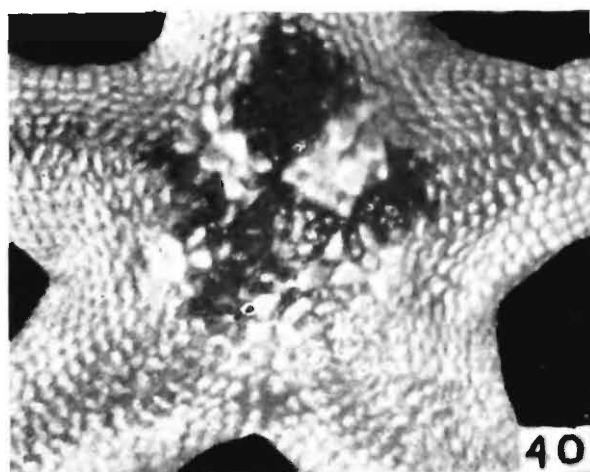
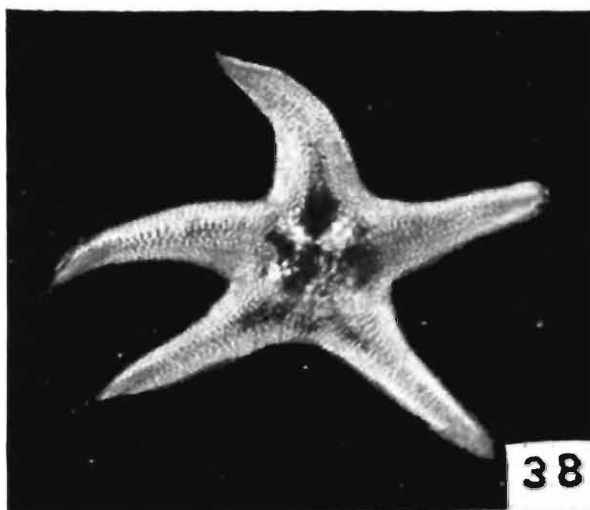
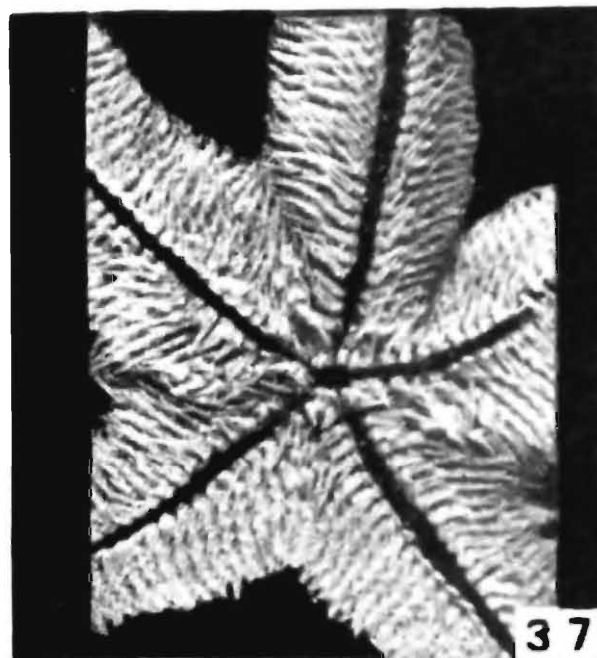
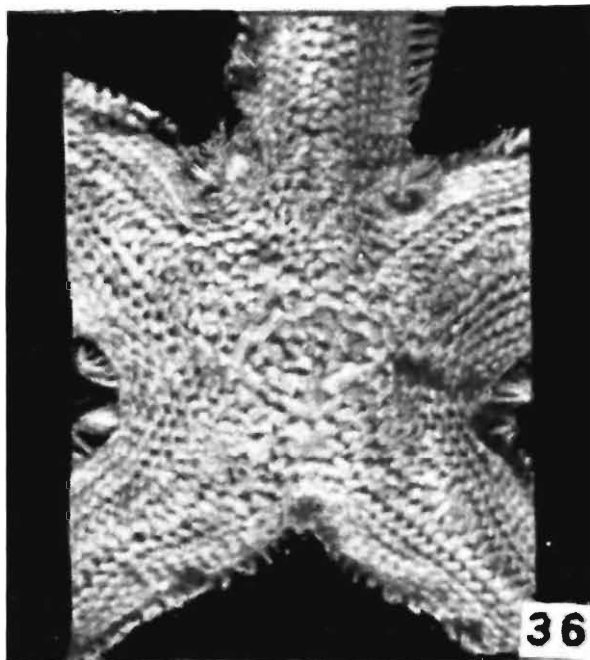
Fig. 25. *Ophiocoma pica* : Kavaratti, d.d.=6 mm, dorsal view.  
Fig. 26. *Ophiothrix (Ophiothrix) trilineata* : Kavaratti, d.d =7 mm, dorsal view.  
Fig. 27. *Diadema savignyi* : Kavaratti, D=30 mm, partially aboral view.  
Fig. 28. *Echinothrix calamaris* : Minicoy, D=50 mm, aboral view,  
Fig. 29. *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.

SASTRY

PLATE VII



- 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.

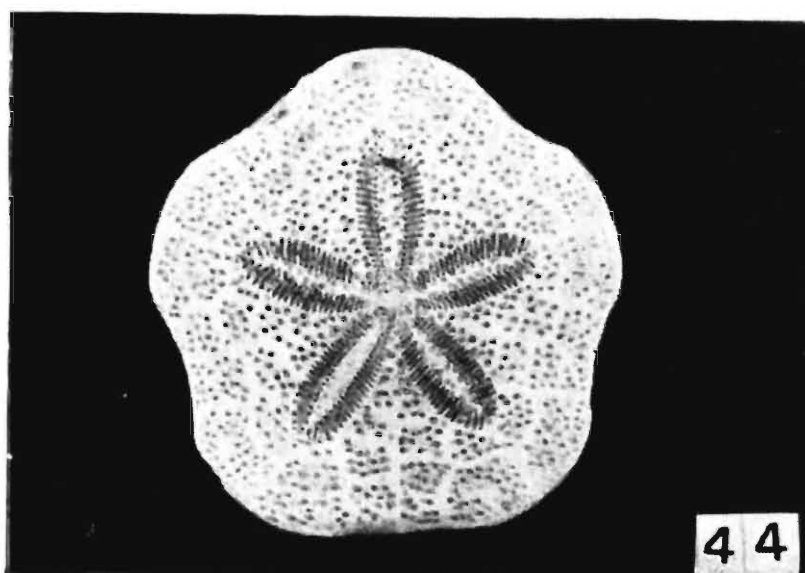
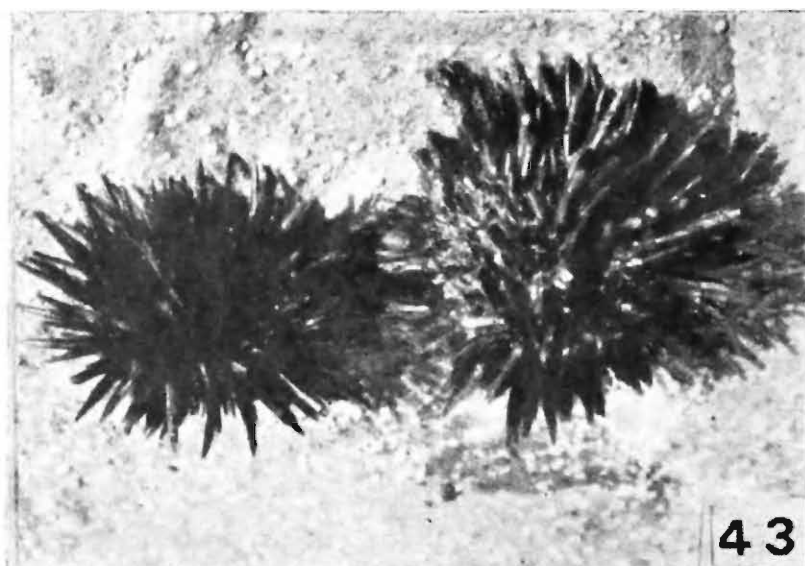
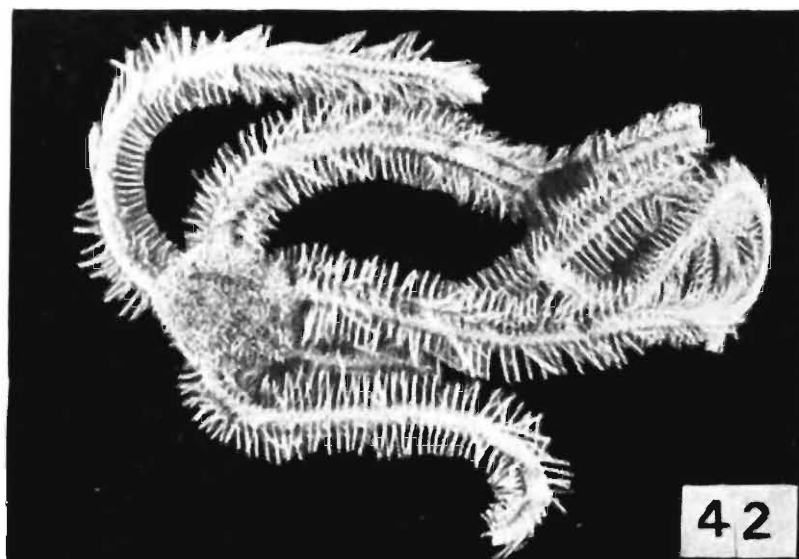


Fig. 42. *Ophiomastix annulosa* : dorsal view.  
Fig. 43. *Stomopneustes variolaris* ; aboral view.  
Fig. 44. *Clypeaster rarispinus* : aboral view.

## 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 Holothuriodea 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* Jaeger, 1833
4. *Holothuria (Holodeima) atra* Jaeger, 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 (Microthele) 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* (Forsk., 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. *Afrocucumis 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 HOLOTHURIIDAE

#### 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 dosal 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 rosottes .....*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 : buttons 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 ..... *Thymiosyca*
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 ..... *Lessonothuria*  
     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) pervicax*  
     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) leucospilota*

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 (Thymiosycia) impatiens*

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 (Thymiosycia) hilla*

Spicules : table disc having numerous holes and smooth wavy ends; but tons oval with three pairs of smaller holes .....*Holothuria (Thymiosycia) 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)

1833. *Holothuria mauritiana* Quoy and Gaimard. *Voyage de decouvertes de L' Astrolabe. Zoologie : Zoophytes. Paris : 138.*

1983. *Actinopyga mauritiana* : Mukhopadhyay and Samanta, *Rec.zool. Surv. India, 81 : 300*

*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)

1833. *Holothuria miliaris* Quoy and Gaimard. *Voyage de decouvertes de L' Astrolabe. Zoologies : Zoophytes. Paris : 137.*

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 pedicels 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*

1983. *Bohadschia marmorata* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India, 81 : 301*

*Material* : Kavaratti island - one specimen

*Description* : Tentacles 18; size 75 mm. Pedicels 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

1833. *Holothuria atra* Jaeger, *De Holothuris. Turici* : 22.

1983. *Holothuria (Halodeima) atra* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India*, **81** : 302

*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

1867. *Holothuria pardalis* Selenka. *Z. wiss. Zool.* **17** : 291-374, pls. 17-20.

1971. *Holothuria (Lessonothuria) pardalis* : Clark and Rowe, *Monogr. Indo-west Pacific Echinod.*, **176**.

*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 spinose 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 circumtropical.

Subgenus **Mertensiothuria**, Deichmann 1958**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.
1983. *Holothuria (Mertensiothuria) leucospilota* : Mukhopadhyay and Samanta, *Rec. zool. Surv. 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
1983. *Holothuria (Mertensiothuria) fuscocinerea* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India*, 81 : 304.

**Material** : Androth island - one specimen

**Description** : Tentacles 20; size very small 35 mm; each pedicel is sarrounded by a white rim, papillae are situated on warty prominences, each row is sarrounded 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 sarrounded 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

1867. *Mulleria nobilis* Selenka. *Z. wiss. zool.* 17 : 313, pl.17; fig. 13-15.

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

1868. *Holothuria difficilis* Semper. *Holothurien. Risen im Archipel der Philippinen 2. Wissenschaftliche Resultate. Weisbaden. Leipzig* 2 (1) : 92, pl.30, fig. 21.

1983. *Holothuria (Platyperona) difficilis* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India*, 81: 303

**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 through out the tropical Indopacific area.

#### Subgenus *Semperothuria* Deichmann, 1958

#### 11. *Holothuria (Semperothuria) cinerascens* (Brandt 1835)

1835. *Stichopus (Gymnochirota) cinerascens* Brandt. *Prodromus descriptionis animalium ab H Mertensio in orbis terrarum circumnavigatione observatorum.* Petropoli 1 : 51.

1983. *Holothuria (Semperothuria) cinerascens* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India*, 81 : 302.

**Material** : Androth island - 4 specimens; Kalpeni island - one specimen.

**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 Indo-west pacific area except Persian Gulf.

#### Subgenus *Thymiosycia*, Pearson, 1914

#### 12. *Holothuria* (*Thymiosycia*) *hilla* Lesson, 1830

1830. *Holothuria hilla* Lesson. *Centurie Zoologique ou choix d' animaux rares, nouveaux ou imparfaitement connues*. Paris : 226, pl. 79.

1983. *Holothuria* (*Thymiosycia*) *hilla* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India*, 81 : 307.

**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 pedicles; 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*. Hauniae : 121, pl.39, fig. 3.

1983. *Holothuria* (*Thymiosycia*) *impatiens* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India*, 81 : 307.

**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 Indo-pacific.

#### 14. *Holothuria (Thymiosycia) arenicola* Semper, 1868

1868. *Holothuria arenicola* Semper. *Holothurien. Risen in Archipel der Philippinen. 2. Wissenschaftliche Resultate. Weisbaden, 2 (1) : 81*  
 1971. *Holothuria (Thymiosycia) arenicola* : Clark and Rowe, *Monogr. Indo-west Pacific Echinod.*, 178.

*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; cuverian 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 through out the tropical Indopacific area.

#### Genus *Labidodemas* Selenka, 1867

#### 15. *Labidodemas rugosum* (Ludwig 1875)

1875. *Holothuria rugosa* Ludwig. *Arb. zool. Inst. Wurzburg 2 (2) : 85.*  
 1983. *Labidodemas rugosum* : Mukhopadhyay and Samanta, *Rec. zool. Surv. India, 81 : 308*

*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 through out the Indopacific littoral waters from Maldiva to Hawaiian islands.

#### Family STICHOPODIDAE

#### Genus *Stichopus* Brandt, 1835

#### 16. *Stichopus chloronotus* Brandt, 1835

1835. *Stichopus (Perideris) chloronotus* Brandt. *Prodromus descriptions animalium ab H. Mertension in orbis terrarum circumnavigatione observatorum. Petropoli. 1 : 50.*  
 1971. *Stichopus chloronotus* : Clark and Rowe, *Monogr. Indo-west Pacific Echinod.*, 178

*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

1868. *Stichopus variegatus* Semper. *Holothurien. risen im Archipel der philippinen 2. wissenschaftliche Resultate*. Weisbaden. 2 (1) : 72.

1971. *Stichopus variegatus* : Clark and Rowe, *Monogr. Indo-west Pacific Echinod.*, 178.

**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 *Thelenota* Clark, 1921

### 18. *Thelenota ananas* (Jaeger, 1833)

1833. *Trepang anonas* Jaeger, *De Holothuriis. Turici* : 24, pl.3, fig. 1.

1983. *Thelenota ananas* : Mukhopadhyoy and Samanta, *Rec. zool. Surv. India* 81 : 309.

**Description** : The specimens are of bigger sizes, upto 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* Weisbade. 2 (1) : 153, pl. 15, fig. 16

1971. *Afrocucumis africana* : Clark and Rowe, *Mongr. Indo-west Pacific Echinod.*, 182.

**Description** : These are small specimens measure about 50 mm in length and a typical cucumariid; 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)

1821. *Holothuria maculata* Chamisso and Eysenhardt. *Nova Acta Acad. Caeser. Leop. Carol.* 10 : 352, pl.25.

1971. *Synapta maculata* : Clark and Rowe, *Monogr. Indo-west Pacific Echinod.*, 186.

*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 Vaney (1908) as *Chondrocloea baselli*.

*Distribution* : Andaman islands and almost throughout the whole Indo-pacific area.

Genus *Euapta* Ostergren, 1898

21. *Euapta godeffroyi* (Semper 1868)

1868. *Synapta godeffroyi* Semper. *Holothurien. Risen im Archipel der Philippinen. 2. wissenschaftliche Resultate, Weisbaden.* 2 (1) : 231, pl.39, fig.13.

1971. *Euapta godeffroyi* : Clark and Rowe, *Monogr. Indo-west Pacific Echinod.*, 184.

*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. *Opheodesoma grisea* (Semper, 1868)

1868. *Synapta grisea* Semper. *Holothurien Risenim Archipel der Philippinen. 2. Wissenschaftliche Resultate. Weisbaden,* 2 (1) : 11.

1971. *Opheodesoma grisea* : Clark and Rowe, *Monogr. Indo-west Pacific Echinod.*, 186.

*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)

1868. *Synapta recta* Semper. *Holothurien. Risen im Archipel der Philippinen. 2. Wissenschaftliche Resultate, Weisbaden. 2 (1) : 14.*

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 anchors and anchor plates, anchor plates with toothed holes, tapering posteriorly, anchors small, miliary granules numerous appearing like minute oval grains.

**Remarks** : This is the first record of the species from Lakshadweep.

**Distribution** : Lakshadweep, Andaman is. in India and Red Sea, Srilanka, East Indies, N. Australia, Philippines is. and S. Japan of the Indo-west pacific area.

### Family CHIRIDOTIDAE

#### Genus *Ploycheira* Clark, 1907

#### 24. *Polycheira rufescens* (Brandt 1835)

1835. *Chiridota rufescens* Brandt. *Prodromus descriptions animalium ab H. Mertensio in orbis terrarum circumnavigatione observatorum. Petropoli 1 : 59.*

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, sacttered reef, sufr 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) difficilis* 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.

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## 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

1. *Actinopyga echinites* Jaeger, 1833. *De Holothuriis*, Turici, p.17

*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.

2. *Bohadschia argus* Jaeger, 1833. *De Holothuriis*, Turici, p. 19.

*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.

3. *Holothuria (Cystipus) rigida* Selenka, 1867. *Z. wiss. Zool.*, 17 : 317.

*Remarks* : Most thick-walled and less active holothurian with blackish 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.

4. *Phyrella fragilis* (Oshima, 1912). *Annotens Zool. Japan*, 8 (1) : 87.

*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 (Mertensiothuria) fusco-cinerea* Jaeger, 1833 2. *Synaptula recta* Semper, 1868 3. *Polycheira rufescens* (Brandt, 1835).