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OBSERVATIONS ON THE DISTRIBUTION OF SOME OF THE MARINE ORGANISMS INHABITING THE INTER-TIDAL ZONE ALONG THE WESTERN CONTINENTAL SHELF OF THE BAY OF BENGAL, WITH PARTICULAR REFERENCE TO THE TAMIL NADU COASTAL STRIP.

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INTRODUCTION

While there are a number of papers which deal with the distribution of marine life of the coral reefs, littoral flora and fauna, etc., of the Bay of Bengal, there are relatively few describing the inter-tidal zonal marine life ; among the notable exceptions, mention may be made of the following workers : Alcock, 1890, 1892 ; Arora and Banerji, 1957 ; Blyth, 1891 ; Carpenter, 1885 ; Chacko, 1949 ; Day, 1958 ; Gravely, 1941, 1942 ; Jenkins, 1912 ; Koumans, 1941 ; Nagabhushanam, 1972 ; Nagabhushanam & Rao, G. C., 1969 ; Nagabhushanam & Rama Rao, K. V., 1984 ; Russell, 1803 ; Satyamurti, 1952, 1956. However, a detailed and comprehensive survey of the inter-tidal zone has been lacking.

One of us (AKN) had the opportunity between 1959-63, 1966-71 and again 1975-86, to carry out detailed surveys along the Orissa, Andhra and Tamil Nadu coasts ; both of us have, during the period 1979-86 had the chance to deal with the Tamil Nadu surveys, and to study the phytal and faunal components collected during those surveys.

MATERIAL AND METHODS

A minimum of thirty qualitative samples each collected at a large number of stations from Orissa, Andhra and Tamil Nadu (MAP) coasts during the shore surveys through out the year are dealt with under two heads for convenience and as such they are :

(*One*) Those pertaining to interstitial life, mostly between Mid-Water Mark (MWM) and Low-Water Mark (LWM) ; (*Two*) Those macro-organisms encountered between High-water Mark (HWM) and LWM. The samples were collected from transects traversing the area between HWM and LWM and brought to the laboratory,

mostly in a live condition, for identification, preserving and cataloguing. The laboratory analyses revealed two facts : (i) the organisms were restricted to such areas which had sand-grains measuring between 150 and 600μ ; such an ideal habitat occurred chiefly between MWM and LWM, where large pebbles and rocky out-crops were absent. In this optimum strip of the inter-tidal zone, samples were taken from surface down to a depth of approximately 100 cms. below the air/sand interface ; (ii) the surface scrapings revealed the presence of a fine film of diatoms ; and the area between 40-70 cms. below surface was found to harbour the maximum concentrations of interstitial forms. Though a number of observations have been made during the surveys, information pertaining only to the species identified in the collections, and their occurrence in the various niches of the inter-tidal zone are presented in this paper.

Observations

(I) *Shore Characteristics* :

To a major extent the shore is made up of fine, medium and coarse grades of siliceous sand-grains along the Orissa, Andhra and Tamil nadu coastline. This sandy inter-tidal zone is interrupted in Andhra at Visakhapatnam and Bimlipatnam ; and in Tamilnadu at Mahabalipuram, Point Calimere, Mandapam and Kanyakumari by rocky outcrops or the Eastern Ghats descending into the sea as rocky ledges forming rock pools of different sizes. Besides these, there are a large number of sand-bottomed tide pools, a classic example of which is the one at Muttukkadu (Tamilnadu). At a number of points in the inter-tidal zone are located man-made harbours with break-waters. Besides are the natural rocky harbours like the one at Visakhapatnam. In south Tamilnadu coralline growths encroach into the inter-tidal zone.

(II) *Flora and Fauna of the Inter-tidal zone* :

The phytal and faunal components identified from the samples collected during the surveys made are presented in Table 1 under five different headings which represent fairly well marked niches : (1) microscopic interstitial forms occurring in the region between MWM & LWM. Macroscopic components of the regions (2) between HWM & MWM, (3) between MWM & LWM, (4) of rock-pools/tide pools, and (5) of rocky outcrops and break waters.

(1) *Microscopic interstitial components* :

The interstitial forms are characteristically concentrated in a wide belt between the MWM and LWM. Our observations indicated an amazing similarity in species composition all along the Bay of Bengal western sandy coastline. At study of the Table 1 for this niche indicates the presence of not less than 14 species of diatoms,

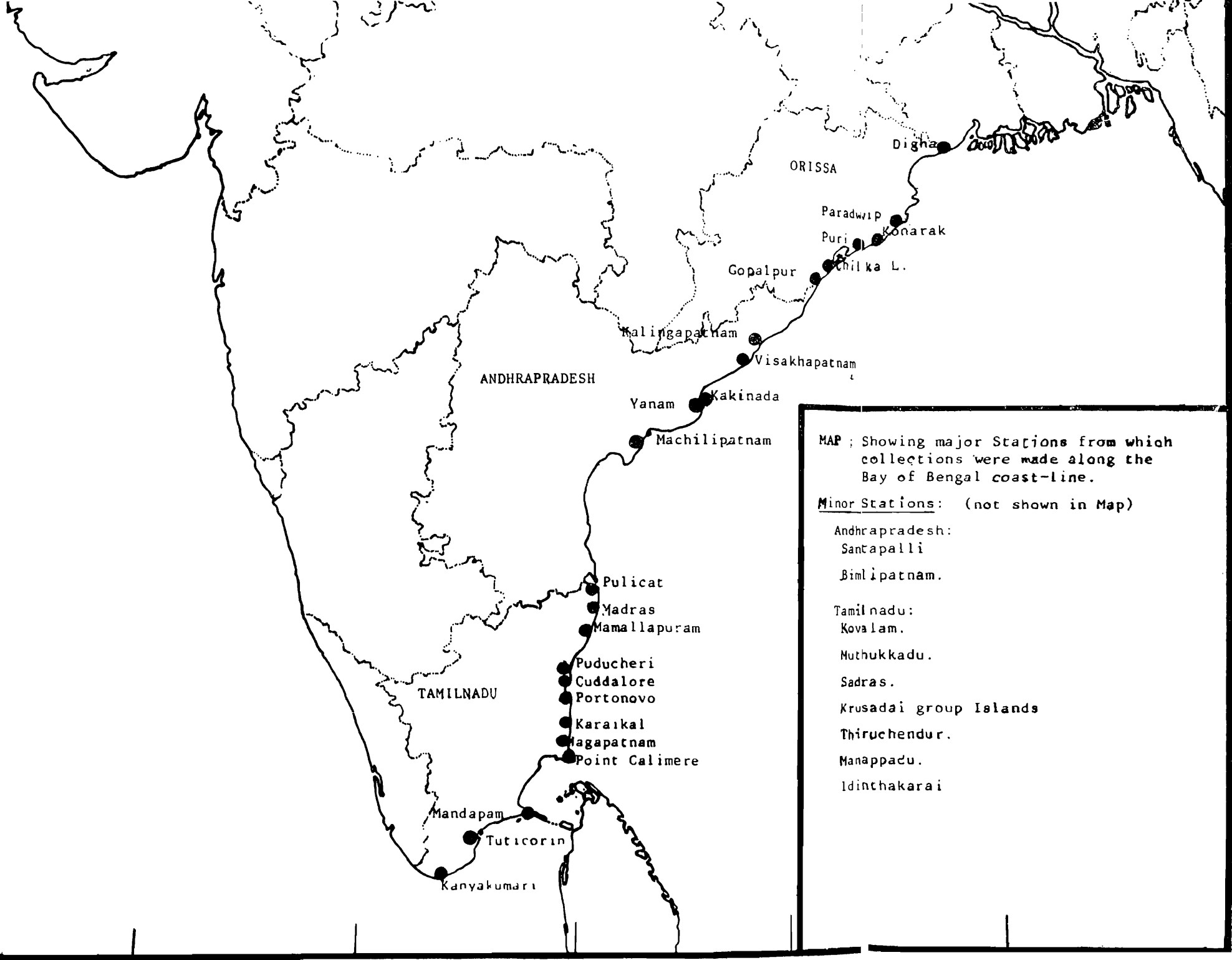
1 species of alga (Cyanophyceae), 1 species of Dinoflagellate, 20 species of Foraminifera, 10 species of Ciliophora (Holotricha), 1 species of Hydrozoa (Actinulida), 4 species of Rotifera, 10 species of Gastrotricha, 4 species of Kinorhyncha, 31 species of Nematoda, 6 species of Archiannelida, 7 species of Polychaeta, 5 species of Oligochaeta, 7 species of Arachnida, 8 species of Ostracoda, 16 species of Copepoda, 2 species of Isopoda and 2 species of Opisthobranchia. The interstitial microfauna occur in large numbers in the interstices between sand grains so as to dominate the population down to a depth of approximately 50 cms. below which depth, their number fall off abruptly, possibly because of impactation of sand grains which results in practically no interstitial space for the organisms to occupy ; coupled perhaps with such factors as higher hydrostatic pressure, lack of oxygen penetration, lack of food material etc.

(2) *Macroscopic components* : *HWM to MWM* :

This niche is unique as it is characterised by high desiccation due to direct insolation for extended periods of time (at least six hours between tides) which precludes survival of delicate marine forms. Only those organisms adapted to extremes of exposure and fluctuations of various physical parameters populate this area. In this niche are found 8 species of free-living Polychaetes (Errantia), 6 species of sedentary Polychaetes (Sedentaria). 8 species of Ostracoda, 4 species of Copepoda, 6 species of Amphipoda, 15 species of Anomura, 6 species of Brachyura, 1 species of prosobranch Gastropod (*Bursa spinosa*) 15 species of Lamellibranchia and 2 species of bony fishes (*Sillago* spp.). It is note-worthy that even these hardy organisms prefer the lower reaches of this niche, namely towards the MWM.

(3) *Macroscopic components* : *MWM to LWM* :

In this niche most of the forms live just under the surface down to a depth of approximately 100 cms. However, the macroflora occur at the air-sand interface. In this niche are found 9 species of Chlorophyceae, 1 species of Dinoflagellate, 1 species of Cystoflagellate, 21 species of Foraminifera, 14 species of holotrich Ciliophora, 1 species of Hydrozoa (*Plumularia setacea*), 1 species of Actinulida, 2 species of alcyonarian Anthozoa, 4 species of zoantharian Anthozoa, 3 species of heteronemertinian Rhynchocoela, 4 species of Rotifera, 10 species of Gastrotrichia, 3 species of Kinorhyncha, 8 species of enoploid Nematoda, 12 species of chromadoroid Nematoda, 4 species of monhysteroid Nematoda, 2 species of axonalaimoid Nematoda, monohysteroid Nematoda, 7 species of Archiannelida, 20 species of free-living Polychaeta, 9 species of sedentary Polychaeta, 4 species of Oligochaeta, 2 species of tardigrade Arachnida, 5 species of acarine Arachnida, 1 species of merostomation Arachnida { (*Tachypleus gigas* (Muller)} which was to be found only along the northern Orissa coast), 8 species of Ostracoda, 16 species of Copepoda, 2 species of Isopoda, 6 species of Amphipoda, 19 species of Anomura, 10 species of Brachyura, 1 species of solenogasteran mollusc (*Chaetoderma* sp.), 78 species of prosobranch Gastropoda, 18 species of opisthobranch



MAP ; Showing major Stations from which collections were made along the Bay of Bengal coast-line.

Minor Stations: (not shown in Map)

Andhrapradesh:
Santapalli
Bimlipatnam.

Tamilnadu:
Kovalam.
Muthukkadu.
Sadras.
Krusadai group Islands
Thiruchendur.
Manappadu.
Idinthakarai

Gastropoda, 2 species of Scaphopoda (*Dentalium* spp), 68 species of Lamellibranchia, 20 species of Holothuria, 17 species of Asteroidea, 18 species of Echinoidea, 21 species of Ophiuroidea, 3 species of Hemichorda, 1 species of Cephalochorda, 2 species of Chondrichthyan Pisces, and 10 species of osteichthyan Pisces.

Small clumps of green algae, in particular, *Ulva* spp. *Enteromorpha*, *Chaetomorpha*, *Cladophora*, *Caulerpa* and *Codium* species occur on the coarser grades of sand. Associated with these clumps are large numbers of very young Nemertines, Nereids and Nephthyid Polychaetes, along with Gastropod, Asteroid and Ophiuroid juveniles, belonging to practically every species of these groups occurring in the zone.

(4) *Rock-pools/Tide-pools* :

In this niche the water contained in the pools showed the presence of five species of Diatoms ; the same five species were represented in films scraped from the rocks, stones, etc., lying in the pools. Also taken were 9 species of Chlorophyceae, 6 species of Phaeophyceae, 15 species of Rhodophyceae, 1 species of Cyanophyceae, 4 species of Dinoflagellata, 1 species of Cystoflagellata, 1 species of sarcodinian Protozoa, 21 species of Foraminifera, 1 species of Radiolaria, 1 species of Heliozoa, 14 species of holotrichous Ciliophora, 2 species of calcareous Porifera, 17 species of demospongiarian Porifera, 4 species of anthomedusan Hydrozoa, 5 species of leptomedusan Hydrozoa, 1 species of actinulid Hydrozoa, 3 species of Siphonophora, 3 species of Chondrophora, 2 species of milliporan Hydrozoa, 1 species of cubomedusan Scyphozoa, 12 species of alcyonarian Anthozoa, 8 species of zoanthid Anthozoa, 7 species of acoelan Turbellaria, 4 species of alloeocoelan Turbellaria, 4 species of polycladid Turbellaria, 1 species of palaeonemertine Rhynchocoela, 3 species of heteronemertine Rhynchocoela, 4 species of Rotifera, 10 species of Gastrotricha, 3 species of Kinorhyncha, 8 species of enoploid Nematoda, 10 species of chromodoroid Nematoda, 1 species of monhysteroid Nematoda, 3 species of axonalaimoid Nematoda, 2 species of desmoscolecoidan Nematoda, 2 species of Entoprocta, 7 species of Archiannelida, 26 species of errant Polychaeta, 14 species of sedentary Polychaeta, 1 species of Oligochaeta, 1 species of Echiuroidea, 5 species of Sipunculida, 1 species of Brachiopoda, 1 species of Phoronida, 2 species of Chaetognatha, 15 species of Ectoprocta, 2 species of tardigrade Arachnida, 5 species of acarine Arachnida, 8 species of Ostracoda, 17 species of Copepoda, 4 species of Isopoda, 7 species of Amphipoda, 8 species of Cirripedia, 7 species of Stomatopoda, 2 species of Mysidacea, 1 species of Palaeomonidea, 15 species of Anomura, 3 species of Macrura, 17 species of Brachyura, 5 species of Polyplacophora, 90 species of prosobranch Gastropoda, 27 species of opisthobranch Gastropoda, 37 species of Lamellibranchia, 8 species of octopod Cephalopoda, 7 species of Crinoidea, 4 species of Holothuroidea, 6 species of Asteroidea, 15 species of Echinoidea, 19 species of Ophiuroidea, 10 species of ascidian Tunicata, 4 species of thaliacean Tunicata, 1 species of larvacean Tunicata,

1 species of Cephalochorda, 2 species of chondrichthyan Pisces, 10 species of Anguilliformes, 1 species of Siluriformes, 2 species of Atheriniformes, 5 species of Syngnathiformes, 11 species of Scorpaeniformes, 36 species of Perciformes, 11 species of Gobiesociformes, 7 species of Tetraodontiformes, 2 species of Batrachoidiformes, 4 species of Lophiiformes, and 2 species of ophidian Reptilia.

Most of the species, particularly those of Pisces, were represented by very young juveniles ; and thus, this niche also must be considered to be a "nursery" for many of the animal groups that occur.

(5) *Rocky out-crops and Break-waters* :

The flora and fauna of this niche consisted of not less than 5 species of Diatomacea, 9 species of Chlorophyceae, 6 species of Phaeophyceae, 15 species of Rhodophyceae, 1 species of Cyanophyceae, 1 species of Dinoflagellata, 1 species of Cystoflagellata, 15 species of Foraminifera, 10 species of holotrich Ciliophora, 2 species of calcarean Porifera, 17 species of demospongiarian Porifera, 3 species of anthomedusan Hydrozoa, 6 species of leptomedusan Hydrozoa, 3 species of Siphonophora, 3 species of Chondrophora, 2 species of milliporan Hydrozoa, 1 species of cubomedusan Scyphozoa, 3 species of rhizostomid Scyphozoa, 12 species of alcyonarian Anthozoa, 5 species of acoelan Turbellaria, 2 species of alloeocoelan Turbellaria, 3 species of polycladid Turbellaria, 1 species of palaeonemertine Rhynchocoela, 3 species of heteronemertine Rhynchocoela, 2 species of Rotifera, 6 species of Gastrotricha, 2 species of Entoprocta, 23 species of errant Polychaeta, 8 species of sedentary Polychaeta, 1 species of Echiuroidea, 5 species of Sipunculida, 1 species of Brachiopoda, 1 species of Phoronida, 15 species of Ectoprocta, 2 species of Isopoda, 4 species of Amphipoda, 8 species of Cirripedia, 6 species of Stomatopoda, 2 species of Mysidacea, 1 species of Palaeomonida, 4 species of Anomura, 1 species of Macrura, 5 species of Brachyura, 5 species of Polyplacophora, 78 species of prosobranch Gastropoda, 23 species of opisthobranch Gastropoda, 25 species of Lamellibranchia, 8 species of Octopod Cephalopoda, 7 species of Crinoidea, 2 species of Holothuroidea, 3 species of Asteroidea, 8 species of Echinoidea, 20 species of Ophiuroidea, 10 species of ascidian Tunicata, 8 species of Anguilliformes, 9 species of Scorpaeniformes, 31 species of Perciformes, 11 species of Gobiesociformes, 7 species of Tetraodontiformes, 2 species of Batrachoidiformes, 4 species of Lophiiformes, and 2 species of ophidian Reptilia.

The rocky outcrops and breakwaters show an almost vertical zonation since the rise and fall of the tide is in the vertical plane, unlike the previously mentioned niches where it is more or less horizontal. This means, in effect, that the stress on the organisms inhabiting this niche is incomparably more.

(III) *Species Analyses* :

A study of Table 1 reveals that the diatoms were to be chiefly taken between MWM and LWM, where they dominated both in surface film and interstitial community. However, a few of them occurred in rock-pools/tide-pools and rocky outcrops/breakwaters.

Among the macroscopic algae there is little doubt that the Chlorophyceae have established themselves in three niches, namely MWM-LWM, Rock-pools and breakwaters, while the Phaeophyceae and Rhodophyceae appear to be restricted to the rock-pools and breakwaters. The cyanophycean *Trichodesmium erythraeum* Ehrenberg, occurs in the diatom film and in the films coating rocks, stones, etc., making up the rock-pools and breakwater niches.

With the exception of one Dinoflagellate, namely *Amphidinium pellucidum* Herdman which occurred in four niches, the rest appeared to be restricted to rock-pools. The Cystoflagellate *Noctiluca miliaris* Suriray occurred at LWM, rock-pools and around the breakwaters. *Amoeba verrucosa* Ehrenberg occurred only in the rock-pools. The Foraminifera appeared to be ubiquitous in distribution, occurring in niches below MWM. The radiolarian and Heliozoan occurred only in the rock-pools. The Ciliophora had a similar distribution to that of the Foraminifera, and together they form the bulk of the Protozoan population wherever the occurred. The sponges were limited to the rock-pools and breakwater niches.

The anthomedusan Hydrozoa were also restricted to the rock-pools and breakwaters. The rest of the Hydrozoa also appeared to be concentrated in the same niches, the exceptions being *Plumularia setacea* (Ellis & Solander) which also occurred at LWM, and the actunilid Hydrozoan, *Halammohydra octopodoides* Remane, which was found in the interstitial fauna and LWM and was not taken in the breakwater niche. The Scyphozoa were found stranded in the tide-pools and breakwaters. The alcyonarian Anthozoan were mainly to be collected from the rock-pools and and interstices of breakwaters, the exceptions being *Pennatula murrayi* Köllicker and *Pteroides espari* Herklotts which occurred in the MWM-LWM niche only. The zoantharian Anthozoa on the other hand showed a distribution chiefly restricted to the rock-pools with only four sand living forms occurring in the MWM-LWM.

The Turbellaria as a group occurred chiefly in the rock-pools and breakwaters. The Palaeonemertine *Tubulanus* sp occurred in rock-pools and breakwaters, while the Heteronemertines occurred in MWM-LWM niche in addition. The Rotifers and Gastrotricha occurred through out the intertidal zone, except in the HWM-MWM niche. The Kinorhyncha occurred in the interstitial and rock-pool niches. The Nematoda as a group occurred through out except in HWM-MWM and breakwater niches. The Entoprocta occurred in the rock-pools and breakwater niches.

The Archiannelida occurred only in the interstitial, MWM-LWM and rock-pool niches. While the errant Polychaeta occurred mainly in the MWM-LWM, rock-pool and breakwater niches, some of them were found in the HWM-MWM (including *Nereis sp.*, and *Nephthys* sp.) ; while others, the microscopic forms, occurred as members of the interstitial community. The sedentary Polychaetes were chiefly restricted to the MWM-LWM, rock-pools and breakwater niches ; however, a few were found in the HWM-MWM niche. Except for *Friedricia bulbosa* (Rosa) which occurred in the rock-pools in addition, the other Oligochaeta were restricted to the interstitial, MWM-LWM niches. The Echiuroid *Thalassema* sp., all Sipunculida, Brachiopoda, Phoronida and Ectoprocta occurred only in the rock-pool and breakwater niches. A few species of Chaetognatha occurred due to stranding in the rock-pool niche. The tardigrade and acarine Arachnida are commonly found occurring in large numbers in the interstitial, MWM-LWM and rock-pool niches.

The Ostracoda form a prominent part of the population in all niches, except the breakwater one. The Copepoda have a distribution pattern identical with the Ostracoda. The Isopoda *Anilocra* spp. and *Cirolana latistylis* Dana are parasites, living attached to young fish. The Isopod *Cymadoce* sp. occurred in the interstices of the breakwater niche. The Amphipoda occurred in all the niches except the interstitial one. The pelagic Amphipod, *Phronima sedentaria* (Forsskål) occurred in the rock-pool niche only, living inside the eviscerated "tests" of *Salpa zonaria* (Pallas). The Cirripedia as a group, occurred only in the rock-pool and breakwater niches where conditions are ideal for their larval settlement and growth. The Stomatopoda, Mysidacea and Palaeomonida occurred only in the rock-pool and breakwater niches. The Anomura chiefly inhabited the HWM-MWM and MWM-LWM niches, with some of them occurring in small numbers in rock-pool and breakwater niches. The Macrura chiefly occurred in the rock-pool niche, with the lobster *Panulirus polyphagus* (Herbst) occurring in the breakwater niche in addition. The Brachyura occurred in the inter-tidal zone generally, particularly towards LWM, but were chlefly represented in the rock-pool niche ; a few inhabited the breakwater niche ; the fiddler crab *Uca* sp. was only found in the HWM-MWM niche on the banks of the larger tide-pools and backwaters.

The aplacophoran Solenogastres *Chaetoderma* sp. occurred in the MWM-LWM niche only. The Polyplacophora (Chitons) were restricted to the rock-pool and breakwater niches. The prosobranch Gastropoda mainly occurred in the rock-pool and breakwater niches ; with a few, particularly the sand living species of the genera *Monilea*, *Umbonium*, *Littorina*, *Neritina*, *Turritella*, *Architectonica*, *Cerithium*, *Triphora*, *Calyptraea*, *Xenophora*, *Strombus*, *Pterocera*, *Natica*, *Cypraea*, *Cassis*, *Murex*, *Thais*, *Nassa*, *Oliva*, *Conus*, and *Terebra*, being found in the MWM-LWM niche. The opisthobranch Gastropoda (with the exception of *Microhedyle* sp. and *Parhedyle* sp. which occur only as members of the interstitial niche) chiefly occurred in the MWM-LWM, rock-pool and breakwater niches. The Aplysians form an important part of the community of

the rock-pool and breakwater niches ; they regularly showed a migratory movement away from the shallow waters during the period January-February. The Scaphopoda are restricted to the MWM-LWM and are found in large colonies in the Gulf of Mannar and Palk Bay areas ; However, they also occurred along most of the coastline of Orissa, Andhra and northern Tamilnadu. The sand-living Lamellibranchia occurred mostly between the MWM and LWM, particularly the following genera, *Modiolus*, *Lithophaga*, *Perna*, *Malleus*, *Pecten*, *Placenta*, *Amussium*, *Cardita*, *Chama*, *Pseudochama*, *Cardium*, *Gafrarium*, *Meretrix*, *Donax*, *Tellina*, *Solen*, *Cuspidaria* etc. ; while rock-living forms like *Limopsis*, *Pinctada*, *Pinna*, *Tridacna*, *Pholas*, *Ostrea*, *Martesia* etc. occurred mainly in the rock-pool and breakwater niches. The octopod Cephalopoda are mainly inhabitants of the rock-pool and breakwater niches.

The Crinoidea are restricted to the rock-pool and breakwater niches. The Holothuroidea prefer a sandy floor and are mainly to be found in the MWM-LWM niche ; However, a few genera like *Holothuria* spp. and *Actinopyga* spp. have been taken from the rock-pool and breakwater niches. The Asteroids occurred commonly in MWM-LWM and rock-pool niches, although *Luidia* sp. have been found in the breawater niche, in addition. Most of the Echinoidea accurred in the MWM-LWM sandy niche. A large percentage of the forms identified occurred in the rock-pool niche ; whereas a few, including species of the following genera, *Stomopneustes*, *Temnopleurus*, *Salmacis*, *Tripneustes*, *Heterocentrotus* and *Echinometra*, occurred in the breakwater niche. Ophiuroids, as a group, occurred in MWM-LWM, rock-pool and breakwater niches.

The Hemichorda *Balanoglossus* sp. and *Ptychodera* sp. were restricted to the MWM-LWM niche, and were to be collected only on certain islands of the Gulf of Mannar. The ascidian Tunicates were found only in the rock-pools and breakwaters. The Thaliacean and Larvacean Tunicates were found trapped in the rock-pools. The Cephalochordate *Amphioxus* sp. was found in the coarse sand at LWM, a few were found trapped in rock-pools.

The cartilagenous fishes are represented by juveniles of *Narcine* sp. at LWM and in the rock-pools, where they lie buried in the sandy bottom. Among the bony fishes, the bulk occurred in the rock-pool and breakwater niches. However, a few like the fishes of the genera *Ophichthys*, *Plotosus*, *Hemirhamphus*, *Platycephalus*, *Sillago*, *Uranoscopus*, *Ichthyoscopus* live either in the sandy floor in the MWM-LWM niche, or swim as juveniles in the rock-pool niche. It is note-worthy most of the fish-groups taken in the inter-tidal zone are juveniles, and hence it is strongly felt that this zone is a nursery area for most of the fish-species. The two species of sea-snakes were found in the rock-pools and breawaters. The sea-turtles, *Chelonia mydas* (L.), *Eretmochelys imbricata* (L.) *Caretta* (*caretta*) *gigas* Deraniyagala and *Lepidochelys olivacea* (Eschscholtz) come ashore during breeding season (November through February) to lay eggs above HWM.

A variety of birds were found frequenting the sandy shore for foraging during low tides. Mention may be made of the Common Swallow, *Hirundo rustica* L. ; the White-bellied Sea Eagle, *Haliaetus leucogaster* (Pallas) ; the Brahminy Kite, *Haliastur indus* (Böddaert) ; the White-crested Water-hen, *Amaurornis phoenicurus* (Pennant) ; the Brown-headed Sea gull, *Larus brunnicephalus* Jerdon ; the Common Tern, *Sterna aurantia* Gray ; the Little Ringed Plover, *Charadrius dubius* Scopoli ; the Common Sand-piper, *Actitis hypoleucos* (L.) the Little Cormorant, *Phalacrocorax niger* (Vieillot) ; the Common Grey Heron, *Ardea cinerea* (L.) ; the Little Egret, *Egretta garzetta* (L.) ; the Indian Reef Heron *Demiegretta asha* (Sykes) ; the Common Teal, *Anas crecca* (L.) ; the Blue-wing Teal *Anas querquedula* L. ; the Pin-tail, *Anas acuta* L. ; and the Shoveller *Spatula clypeata* (L.). Of these, the swallows were rarely observed, while others, like teals and pin-tails, were migrants seen during October-December.

The species composition of the major groups worked out by us is presented in Table 2 ; from a study of the Table, it would appear that the Mollusca, Arthropoda, Pisces and Echinodermata contribute 60% of the total species populating the inter-tidal zone.

DISCUSSION

The distributions of various marine species is of great interest from both academic and commercial stand-points. The present paper fills in information on distribution of some marine species in the inter-tidal zone of the western continental shelf of the Bay of Bengal, with particular reference to the Tamilnadu coast. Our studies reveal a wealth of flora and fauna particularly in the MWM-LWM part of the sandy sea-floor, whether interstitial-dwelling minute forms or macroflora and macrofauna living at the surface or just below it (as members of sandy-bed infauna). Near LWM the sizes of the animals revealed that this niche (MWM-LWM) was in effect a nursery. Similarly, a study of the rock-pool and tide-pool indicated that they also serve as nurseries.

In conclusion, this study has shown that a large number of marine flora and fauna are colonizing, and thriving, in the inter-tidal zone of the Bay ; future work will have to determine the environmental factors, physical and chemical, which help them, individually and severally, to live in the niches of this zone. There is little doubt that future work will only add to our lists of species populating the inter-tidal zone.

SUMMARY

The bulk of the micro-and macro-fauna of the inter-tidal zone stretching from the False Point Light-house (North Orissa) to Kanyakumari (South Tamil Nadu) is located between the Mid-Water Mark (MWM) and Low-Water Mark (LWM). The micro-flora consists of vast diatom films near MWM and is made up of fourteen (14)

dominant species. The interstitial micro-fauna prefer a sandy habitat where the sand-grains measure between 150 and 600μ. A large number of interstitial forms belonging to Protozoa, Coelenterata, Platyhelminthes, Nematoda, Gastrotricha, Kinorhyncha, Nemertinea, Rotifera, Annelida (chiefly Polychaeta ; a few Oligochaeta), Crustacea, Arachnida and Mollusca were collected from this niche. The macro-fauna included large groupings of organisms, which have been presented in detail. The occurrence of algae with associated nemertines, polychaetes, etc., have been studied ; as also the peculiar occurrence of some geographically restricted forms, e. g., the Horse-shoe Crab, *Limulus molluccanus* Latr. *Tachypleus gigas* (Muller) The flora and fauna of the rock-pools of the inter-tidal zone, as also the population of the artificial breakwaters at ports have been studied ; a few sightings of birds, turtles which frequent the inter-tidal zone has been reported.

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TABLE 1. Occurrence and distribution of the various components of flora and fauna in the niches of the inter-tidal zone of the western continental shelf of the Bay of Bengal. + Presence, — Absence.

Species / Niche	1 Microscopic Interstitial Froms MWM/LWM	2 Macroscopic Inter-Tidal HWM/ MWM	3 MWM/ LWM	4 Rock-Pool/ Tide-Pool	5 Rocky out crops & Break-waters
FLORA : DIATOMACEA :					
Asterionella japonica Cleve & Möler	+	—	—	—	—
Biddulphia chinensis Greville	+	—	—	—	—
B. mobiliensis Bailley	+	—	—	—	—
Chaetoceros affine Lauder	+	—	—	—	—
C. diversum Cleve	+	—	—	—	—
Coscinnodiscus centralis Ehrenberg	+	—	—	+	+
Hemidiscus spp.	+	—	—	+	+
Nitzschia seriata Cleve	+	—	—	+	+
Pleurosigma elongatum Smith	+	—	—	—	—
P. aestuarii Smith	+	—	—	—	—
Rhizosolenia robusta Norman	+	—	—	+	+
R. crassispina Schröder	+	—	—	+	+
Thallasionema nitzschoidea Grünow	+	—	—	—	—
Thallasiothrix fraunfeldi Grünow	+	—	—	—	—
: CHLOROPHYCEAE :					
Ulva fasciata Delile	—	—	+	+	+
Ulva lactuca L.	—	—	+	+	+
U. rigida J. Agardh	—	—	+	+	+
U. reticulata Forsskål	—	—	+	+	+
Enteromorpha compressa Greville	—	—	+	+	+
Chaetomorpha sntennia Keutzing	—	—	+	+	+
Cladophora spp.	—	—	+	+	+
Caulerpa sertularoides Howe	—	—	+	+	+
Codium tomentosum Stackhouse	—	—	+	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
: Phaeophyceae :					
Dictyota dichotoma Lamouroux	—	—	—	+	+
Padina gymnospora Vickers	—	—	—	+	+
Colpomenia sinuosa Derbis & Solier	—	—	—	+	+
Cystophyllum muricatum J. Agardh	—	—	—	+	+
Sargassum myriocystum J. Agardh	—	—	—	+	+
S. johnstonii Setchell & Gardner	—	—	—	+	+
: Rhodophyceae :					
Porphyra vietnamensis Tanaka & Ho	—	—	—	+	+
Gelidiella acerosa Feldman & Hamel	—	—	—	+	+
Grateloupia lithophila Boergesen	—	—	—	+	+
Gracilaria cortica J. Agardh	—	—	—	+	+
G. lichenoides Harvey	—	—	—	+	+
G. verrucosa Papenfuss	—	—	—	+	+
Sarconema furcellatum Zanardini	—	—	—	+	+
Hypnea musciformis Lamouroux	—	—	—	+	+
Gigartina acicularis Lamouroux	—	—	—	+	+
Rhodymenia dissecta Boergesen	—	—	—	+	+
Centroceras clavulatum Montague	—	—	—	+	+
Spyridia filamentosa Harvey	—	—	—	+	+
Acanthophora spicifera Boergesen	—	—	—	+	+
Laurencia pappilosa Greville	—	—	—	+	+
L. obtusa Lamouroux	—	—	—	+	+
: Cyanophyceae :					
Trichodesmium erythraeum Ehrenberg	+	—	—	+	+
FAUNA					
PROTOZOA : FLAGELLATA : DINOFLAGELLATA :					
Amphidinium pellucidum Herdman	+	—	+	+	+
Gymnodinium splendens Lebour	—	—	—	+	—
Ceratium brachyceros Daday	—	—	—	+	—

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
C. furcoides Langerhans	—	—	—	+	—
: CYSTOFLAGELLATA :					
Noctiluca miliaris Suriray	—	—	+	+	+
: SARCODINA : LOBOSA :					
Amoeba verrucosa Ehrenberg	—	—	—	+	—
: FORAMINIFERA :					
Allogromia oviformis (Dujardin)	+	—	+	+	—
Lagena striata var. semistriata Williamson	+	—	+	+	+
L. marginata (Walker & Boys)	+	—	+	+	+
Nodosaria japonica Cushman	—	—	+	+	—
Robulus calcar L.	+	—	+	+	—
Loxostomina limbatum Brady	+	—	+	+	+
Discarbis vesicularis Lamarck	+	—	+	+	+
Rotalia pulchella d'Orbigny	+	—	+	+	—
Globigerina bulloides d'Orb.	+	—	+	+	+
Orbulina universa d'Orb.	+	—	+	+	+
Globorotalia menardii d'Orb.	+	—	+	+	+
Nonionella auris (d'Orb)	+	—	+	+	—
Elphidium craticulum Höfker	+	—	+	+	+
Milliammina oblonga Chapman	+	—	+	+	+
Quinqueloculina lamarckina d'Orb.	+	—	+	+	+
Q. vulgaris d'Orb.	+	—	+	+	+
Spiroloculina antillarum d'Orb.	+	—	+	+	+
Triloculina tricarinata d'Orb.	+	—	+	+	+
Amphistegina lessoni d'Orb.	+	—	+	+	+
Trochammina inflata Montague	+	—	+	+	—
Entzia tetrastomella Daday	+	—	+	+	—
: RADIOLARIA :					
Acanthometra spp.	—	—	—	+	—
: HELIOZOA :					
Actinophrys sol Ehrenberg	—	—	—	+	—

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
: CILIOPHORA : HOLOTRICHA :					
Coleps tesselatus Kahl	—	—	+	+	—
Prorodon morgani Kahl	+	—	+	+	+
Lacrymaria olor O. F. Müller	+	—	+	+	+
Geleia decolor Kahl	+	—	+	+	+
Remanella margaritifera Kahl	—	—	+	+	+
Trachelocerca entzi Kahl	—	—	+	+	+
Metopus mathiasi Villeneuve-Brachon	+	—	+	+	+
Folliculina elegans Claparédè & Lachmann	+	—	+	+	+
Condylostoma patens (O. F. Müller)	—	—	+	+	—
Euplotes moebusi Kahl	+	—	+	+	+
Aspidiscus dentata Kahl	+	—	+	+	+
Diophrys appendiculatus (Ehrenberg)	+	—	+	+	—
Epiclintes ambiguus Bütschli	+	—	+	+	—
Keronopsis rubra (Ehrenberg)	+	—	+	+	+
PORIFERA : CALCAREA :					
Grantia compressa (Fabricius)	—	—	—	+	+
Leucosolenia spp.	—	—	—	+	+
: DEMOSPONGIARIA :					
Polymastia mammillaris (O. F. Müller)	—	—	—	+	+
Suberites epiphytum (Lam.)	—	—	—	+	+
S. carnosus (Johnston)	—	—	—	+	+
Rhizaxinella elongata (Ridley & Dendy)	—	—	—	+	+
Clione celata Grant	—	—	—	+	+
Axinella polyploides Schmidt	—	—	—	+	+
Phakellia vermiculata (Bowerbank)	—	—	—	+	+
Aplysilla rosea (Barrios)	—	—	—	+	+
Dysidea fragilis (Montagu)	—	—	—	+	+
Haliclona cancellata (Montagu)	—	—	—	+	+
Gelloides carnosa Dendy	—	—	—	+	+
Reniera spp.	—	—	—	+	+

TABLE 1. (*Continued*)

Species/Niche	1	2	3	4	5
Amphilectus fucorum Esper	—	—	—	+	+
Desmacidon fruticosum (Montagu)	—	—	—	+	+
Raspailia fruticosa Dendy	—	—	—	+	+
R. hispida (Montagu)	—	—	—	+	+
Halichondrina panacea (Pallas)	—	—	—	+	+
COELENTERATA : HYDROZOA : ANTHOMEDUSAE :					
Sarsia conica (Haeckel)	—	—	—	+	+
Pennaria armata Vanhöffen	—	—	—	+	—
Zanclea (*Gemmaria*) *costata* Gegenbaur	—	—	—	+	+
Bougainvillia fulva Agassiz & Mayer	—	—	—	+	+
: LEPTOMEDUSAE :					
Campanularia spp.	—	—	—	+	+
Sertularia operculata (L.)	—	—	—	+	+
S. rugosa Gray	—	—	—	+	+
Plumularia setacea (Ellis & Solander)	—	—	+	+	+
Aglaophenia spp.	—	—	—	+	+
Aequora pensilis (Eschscholtz)	—	—	—	+	+
: ACTINULIDA :					
Halammohydra octopodides Remane	+	—	+	+	—
: SIPHONOPHORA :					
Physalia physalis (L.)	—	—	—	+	+
Diphyes dispar Chamisso & Eysenhardt	—	—	—	+	+
D. bojani (Eschscholtz)	—	—	—	+	+
: CHONDROPHORA :					
Velella velella (L.)	—	—	—	+	+
Porpita parpita (L.)	—	—	—	+	+
Porpema prunella (Haeckel)	—	—	—	+	+
: MILLIPORINA :	—	—	—	+	+
Millipora alcicornis L.	—	—	—	+	+
M. tenera Boschma	—	—	—	+	+

TABLE 1. (*Continued*)

Species/Niche	1	2	3	4	5
: SCYPHOZOA : CUBOMEDUSAE :					
Chiropsalmus quadrigatus Haeckel	—	—	—	+	+
: RHIZOSTOMEAE :					
Cassiopea andromeda (Forsskäl)	—	—	—	+	+
Crambionello orsini (Vanhöffen)	—	—	—	+	+
Rhopilema hispidum (Vanhöffen)	—	—	—	+	+
: ANHOZOA : ALCYONARIA :					
Tubipora musica L.	—	—	—	+	+
Telesto trichostemma Dana	—	—	—	+	+
Alcyonium pachyclades Klünzinger	—	—	—	+	+
Sarcophyton glaucum Quoy et Gaimard	—	—	—	+	+
S. latum Dana	—	—	—	+	+
S. palmatum Pratt	—	—	—	+	+
Melitodes variabilis Hickson	—	—	—	+	+
Solenocaulon ramosa Hickson	—	—	—	+	+
Spongodes flabellifera (W. & S.)	—	—	—	+	+
Juncella juncea Pallas	—	—	—	+	+
Gorgonia spp.	—	—	—	+	+
Gorgonella umbella Esper	—	—	—	+	+
Pennatula murrayi Kölliker	—	—	+	—	—
Pteroeides espari Herklotts	—	—	+	—	—
: ZOANTHARIA :					
Stoichactis giganteum (Forsskäl)	—	—	+	—	—
Zoanthus spp.	—	—	+	+	—
Sphenopus marsupialis (Gmelin)	—	—	+	—	—
Cerianthus spp.	—	—	+	—	—
Favia cavernosa (Forsskäl)	—	—	—	+	—
F. halicora Klünzinger	—	—	—	+	—
Euphyllia glabescens (Chamisso)	—	—	—	+	—
Fungia danae Ed. & H.	—	—	—	+	—

TABLE 1. (*Continued*)

Species/Niche	1	2	3	4	5
Acropora digitifera (Dana)	—	—	—	+	—
Porites lichen (Dana)	—	—	—	+	—
Coeloria astraeaformes (Ed. & H.)	—	—	—	+	—
PLATYHELMINTHES : TURBELLARIA : ACOELA :					
Convoluta saliens (Graff)	—	—	—	+	+
C. convolute (Abildgaard)	—	—	—	+	+
Macrostomum appendiculatum (Fabricius)	—	—	—	+	+
Acanthomacrostomum spiculifarum Papi & Swedmark	—	—	—	+	+
Provortex affinis (Jensen)	—	—	—	+	—
Gyrathrix hemaphroditus Ehrenberg	—	—	—	+	—
Fecampia erythrocephala Giard	—	—	—	+	+
: ALLOEOCOELA :					
Plagiostomum sulphureum Graff	—	—	—	+	—
Pseudostomum inerme (Hallez)	—	—	—	+	—
Monocelis lineata (O. F. Müller)	—	—	—	+	+
Otoplana baltica Meixner	—	—	—	+	+
: POLYCLADIDA :					
Leptoplana tremallaris (O. F. Müller)	—	—	—	+	+
Baltoplana magna Karling	—	—	—	+	+
Cycloporus papillosus Lang	—	—	—	+	—
Coelogymopora aculeata Ax	—	—	—	+	+
RHYNCHOCOELA : PALAEONEMERTINI :					
Tubulonus spp.	—	—	—	+	+
HETERONEMERTINI :					
Lineus albovittatus Bürger	—	—	+	+	+
Cerebratulus gardineri Punnett	—	—	+	+	+
Baseodiscus (*Eupolia*) *hemprichi* (Ehrenberg)	—	—	+	+	+
ASCHELMINTHES : ROTIFERA : MONOGONATA :					
Encentrum spp.	+	—	+	+	+
Synchaeta spp.	+	—	+	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Asplanchna spp.	+	—	+	+	—
Testudinella spp.	+	—	+	+	—
: GASTROTRICHA : MACRODASYOIDEA :					
Macrodasys caudatus Remane	+	—	+	+	+
Paradasys turbanelloides Boaden	+	—	+	+	+
Paraturbanella spp.	+	—	+	+	—
Tetrachyroderma megastoma (Remane)	+	—	+	+	+
T. suicica Boaden	+	—	+	+	+
Thaumastoderma heideri Remane	+	—	+	+	+
Pseudostomella roscovita Swedmark	+	—	+	+	+
: CHAETONOIDEA :					
Chaetonotus spp.	+	—	+	+	—
Xenotricula velox Remane	+	—	+	+	—
Aspidophorus marinus Remane	+	—	+	+	—
: KINORHYNCHA : CYCLORHAGAE :					
Echinoderes spp.	+	—	+	+	—
Caterin styx Gerlach	+	—	+	+	—
: CONCHORHAGAE :					
Semnoderes spp.	+	—	—	—	—
: HOMALORHAGAE :					
Pycnophyes dentatus (Reinbardt)	+	—	+	+	—
: NEMATODA : ENOPLOIDEA :					
Anticoma arctica Steiner	+	—	+	+	—
Platycoma africans (Gerlach)	+	—	+	+	—
Enoploides spp.	+	—	+	+	—
Halalaimus longicollis Allgen	+	—	+	+	—
Oncholaimus brachycercus de Man	+	—	+	+	—
Eurystomina ornatum var. indicum Micol & Kreis	+	—	+	+	—
Viscosia spp.	+	—	+	+	—

TABLE 1. (*Continued*)

Sepcies / Niche	1	2	3	4	5
Mesacanthion spp.	+	—	+	+	—
: CHROMODOROIDEA :					
Halichoanolaimus robustus Bastian	+	—	+	+	—
Menopostia spp.	+	—	+	+	—
Chromospirina spp.	+	—	+	+	—
Chromodora vulgaris Bastian	+	—	+	+	—
Dichromodora spp.	+	—	+	—	—
Metachromodora clavata Gerlach	+	—	+	—	—
Chromogaster alatum Gerlach	+	—	+	+	—
Sabatiera abysalis (Filipjèv)	+	—	+	+	—
Dasynemella spp.	+	—	+	+	—
Gammanema cancellatum Gerlach	+	—	+	+	—
Metepsilonema spp.	+	—	+	+	—
Pterygonema ornatum Timm	+	—	+	+	—
: MONHYSTEROIDEA :					
Sphaerolaimus pacificus Allgen	+	—	+	+	—
Theristus tortuosa Timm	+	—	+	—	—
Steineria spp.	+	—	+	—	—
Monhystera parva Bastian	+	—	—	—	—
Rhynchonema cinctum Cobb	+	—	—	—	—
Cytolaimus exile Cobb	+	—	+	—	—
: AXONALAIMOIDEA :					
Comacolaimus prytherchi Chitwood	+	—	+	+	—
Bathylaimus spp.	+	—	—	+	—
Cynura papillata Gerlach	+	—	+	+	—
: DESMOSCOLECOIDEA :					
Desmoscolex bengalensis Timm	+	—	—	+	—
Tricoma spp.	+	—	—	+	—
ENTOPROCTA :					
Loxosoma spp.	—	—	—	+	+
Pedicellina spp.	—	—	—	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
ANNELIDA : ARCHIANNELIDA					
Polygordius madrasensis Aiyar & Alikunhi	—	—	+	+	—
Protodrilus indicus Aiyar & Alikunhi	+	—	+	+	—
P. pierantonii Aiyar & Alikunhi	+	—	+	+	—
Saccocirrus minor Aiyer & Alikunhi	+	—	+	+	—
Diurodrilus benazzi Gerlaeh	+	—	+	+	—
Nerillidium mediterraneum Remane	+	—	+	+	—
Dinophilus taeniatus Harmer	+	—	+	+	—
: POLYCHAETA : ERRANTIA :					
Aphrodite aculeata L.	—	—	—	+	+
Hermione hystrix (Savigny)	—	—	—	+	+
Lepidonotus carinulatus Grübe	—	—	—	+	+
Harmathoe indica (Kinberg)	—	—	—	+	+
Pisions complexa Alikunhi	+	—	+	+	—
Chloeia flava Pallas	—	—	—	+	+
Hesionides arenarius Friedrich	+	—	+	+	+
H. gohari Hartmann-Schröder	+	—	+	+	+
Phyllodoce castanea (Marenzeller)	—	—	+	+	+
Tomopteris elegans Chun	—	—	+	+	—
Syllis spongicola Grübe	—	—	+	+	+
Eusyllis homocirratus Hartmann-Schröder	+	—	+	+	+
Paraspionosyllis spp.	+	—	+	+	+
Sphaerosyllis bengalensis Rao & Ganapati	+	—	+	+	+
Dendronereis arborifera Peters	—	—	+	+	+
Nereis trifasciata Grübe	—	+	+	+	+
N. chilkaensis Southern	—	+	+	+	+
N. mirabilis Kinberg	—	+	+	+	+
Nephthys gravieri Augener	—	+	+	+	+
Eunice tentaculata Quatrefages	—	—	+	+	+
Marphysa graveli Southern	—	—	+	+	+
Dioptera neapolitana Della Chiaje	—	+	+	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Onuphis eremita Audouin & Milne-Edw.	—	+	+	+	+
Lumbriconereis impatiens Claparédè	—	+	+	+	+
Glycera rouxii Aud & M.-Edw.	—	+	+	+	+
Petitia amphophthalma Siewing	+	—	—	+	—
: SEDENTARIA :					
Nerine cirratulus Della Chiaje	—	+	+	+	+
Polydora coeca Öersted	—	—	—	+	+
Prionospio krusadensis Fauvel	—	—	+	+	—
Cirratulus filiformis Keferstein	—	—	+	+	+
Phyllochaetopterus ellioti Crossland	—	+	+	+	—
Maldane sarsi Malmgren	—	—	+	+	—
Sabellaria pectinata Fauvel	—	+	+	+	—
Pectinaria crassa Grübe	—	+	+	—	—
Loimia medusa (Savigny)	—	—	+	+	—
Sabella porifera Grübe	—	+	+	+	—
Serpula vermicularis L.	—	—	—	+	+
Hydroides norvegica (Gunnerus)	—	—	—	+	+
H. albiceps (Ehrenberg)	—	—	+	+	+
Pomatoceros caerulus (Schmarda)	—	—	—	—	+
Spirorbis foraminosus Moore	—	—	—	+	+
: OLIGOCAETA : LIMIGOLAE :					
Achaeta spp.	+	—	+	—	—
Enchytraeus barkudensis Stephenson	+	—	+	—	—
Friedricia bulbosa (Rosa)	+	—	+	+	—
Mishaelsena spp.	+	—	+	—	—
Propappus spp.	+	—	—	—	—
ECHIUROIDEA :					
Thalassema spp.	—	—	—	+	+
SIPUNCULIDA :					
Sipunculus indicus Peters	—	—	—	+	+
Siphonosoma vastum (Selenka & Bulow)	—	—	—	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Aspidosiphon steenstrupii Diesing	—	—	—	+	+
Phascolosoma dentigerum Selenka & de Man	—	—	—	+	+
Physosema rupellii Grübe	—	—	—	+	+
BRACHIOPODA : INARTICULATA :					
Lingula spp.	—	—	—	+	+
PHORONIDA :					
Phoronis spp.	—	—	—	+	+
CHAETOGNATHA :					
Krohnitta subtilis (Grassi)	—	—	—	+	—
Sagitta spp.	—	—	—	+	—
ECTOPROCTA : GYMNOLAENATA : CTENOSTMATA :					
Bowerbankiw caudata (Hincks)	—	—	—	+	+
Alcyonidium polyoum (Hassal)	—	—	—	+	+
: CHEILOSTOMATA :					
Membranipora membranacea (L.)	—	—	—	+	+
Eleotra bellula (L.)	—	—	—	+	+
Flustra foliacea (L.)	—	—	—	+	+
Micropora coracea (Esper)	—	—	—	+	+
Bugula neritina (L.)	—	—	—	+	+
B. flabellata (Thompson)	—	—	—	+	+
Hippothoa divaricata Lamouroux	—	—	—	+	+
Hippoporina porcellana (Esper)	—	—	—	+	+
Microporella ciliata (Pallas)	—	—	—	+	+
Adona violacea (Johnston)	—	—	—	+	+
Parasmittina trispinosa (Johnston)	—	—	—	+	+
: CYCLOSTOMATA :					
Crisia elongata Harmer	—	—	—	+	+
C. aculeata Hassall	—	—	—	+	+
ARTHROPODA : ARACHNIDA : TARDIGRADA :					
Stygarctus bradypus Schültz	+	—	+	+	—
Batillipes carnonensis Fize	+	—	+	+	—

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
: ACARINA :					
Actacarus pygmaeus Schültz	+	—	+	+	—
Copedognathus spp.	+	—	+	+	—
Halacarus anomalus Trouessart	+	—	+	+	—
Rhombognathus spp.	+	—	+	+	—
Simognathus sculptus (Brady)	+	—	+	+	—
: MEROSTOMATA :					
Tachypleus gigas (Muller)	—	—	+	—	—
: CRUSTACEA : OSTRACODA :					
Polycope areolata Sars	+	+	+	—	—
P. orbicularis Sars	+	+	+	+	—
Cythereis runcinata (Baird)	+	+	+	+	—
Microcythere subterranea Hartmann	+	+	+	+	—
Loxoconcha tamarindus (T. R. Jones)	+	+	+	+	—
L. guttata (Norman)	+	+	+	+	—
Xestoleberis depressa Sars	+	+	+	+	+
X. aurantia (Baird)	+	+	+	+	—
: COPEPODA :					
Paracalanus sp.	—	—	—	+	—
Ameira trisetosa Krishnaswamy	+	—	+	+	—
Arenopontia indica Rao	+	—	+	+	—
A. subterranea Künz	+	—	+	+	—
Arenostella germanica Künz	+	—	+	+	—
Harpactica spp.	+	—	+	+	—
Kleionychocamptoides remanei Noodt	+	—	+	+	—
Laophonte spp.	+	—	+	+	—
Leptopscyllus spp.	+	—	+	+	—
Paramesochra pseudogracilis (Krishnaswamy)	+	—	+	+	—
P. wilsoni Krishnaswamy	+	—	+	+	—
Pararenosetella spp.	+	—	+	+	—
Psammopscyllus operculatus Nicholls	+	+	+	+	—
Schizopera spp.	+	—	+	+	—

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Sewellina reductus Krishnaswamy	+	+	+	+	—
Stigmatidium arenosetelloides Noodt	+	+	+	+	—
Tisbe spp.	+	+	+	+	—
: ISOPODA :					
Anilocra spp.	—	—	—	+	—
Cirolana latistylis Dana	—	—	—	+	—
Cymadoce spp.	—	—	—	—	+
Angeliera phraeticola Chappuis et Delamare	+	—	+	+	+
Microcerebrus predatoris (Gnanamuthu)	+	—	+	+	—
: AMPHIPODA :					
Cymadusa filosa Savigny	—	+	+	+	+
C. microphthalma (Chevrèux)	—	+	+	+	+
Gammaropsis atlanticus Stebbing	—	+	+	+	+
Leucothoe farina (Savigny)	—	+	+	+	—
Melita spp.	—	+	+	+	—
Paragrubia vorax Chevrèux	—	+	+	+	+
Phronima sedentaria (Forsskål)	—	—	—	+	—
: CIRRIPEDIA :					
Balanus tintinnabulum (L.)	—	—	—	+	+
B. amphitrite Darwin	—	—	—	+	+
B. longirostrum Hoek	—	—	—	+	+
Chthamalus spp.	—	—	—	+	+
Lepas anserifera L.	—	—	—	+	+
L. anatifera L.	—	—	—	+	+
Lithotrya spp.	—	—	—	+	+
Pyrogoma grande (Sowerby)	—	—	—	+	+
: STOMATOPODA :					
Gonodactylus chiragra (Fabr.)	—	—	—	+	+
G. falcatus (Forsskål)	—	—	—	+	+
Oratosquilla nepa Latrielle	—	—	—	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
O. woodmasoni (Kemp)	—	—	—	+	+
Lysiosquilla spp.	—	—	—	+	—
Pseudosquilla ciliata (Fabr.)	—	—	—	+	+
Odontodactylus brevirostris (Miers)	—	—	—	+	+
: MYSIDACEA :					
Acetes dispar Hansen	—	—	—	+	+
Gastrosaccus spp.	—	—	—	+	+
: PALAEOMONIDEA :					
Leander spp.	—	—	—	+	+
: ANOMURA :					
Albunea symnista (L.)	—	+	+	—	—
A. microps Miers	—	+	+	—	—
Calcinus elegans (Milne-Edwards)	—	+	+	+	—
C. herbstii De Man	—	+	+	+	—
C. gaimardi (Milne-Edwards)	—	+	+	+	—
Clibanarius humilis Dana	—	+	+	+	+
Dardanus deformis (Milne-Edwards)	—	+	+	+	+
D. scabrimanus (Dana)	—	+	+	+	+
D. varipes (Heller)	—	+	+	+	+
Diogenes gardineri Alcock	—	—	+	+	—
D. custos Fabr.	—	—	+	+	—
D. diogenes (Herbst)	—	—	+	+	—
D. avarus Heller	—	—	+	+	—
Emerita asciatica (Milne-Edwards)	—	+	+	—	—
Hippa spp.	—	+	+	—	—
Pagurus spp.	—	+	+	+	—
Eupagurus spp.	—	+	+	+	—
Remipes pacificus Dana	—	+	+	+	—
Spiropagurus spirifer (De Haan)	—	+	+	+	—

TABLE 1. (*Continued*)

Species/Niche	1	2	3	4	5
: MACRURA :					
Solenocera melantho De Man	—	—	—	+	—
Trachypenaeus curvirostris Stimpson	—	—	—	+	—
Panulirus polyphagus (Herbst)	—	—	—	+	+
: BRACHYURA :					
Acarina septumspinosa (Fabricius)	—	—	—	+	—
Calappa hepatica (L.)	—	—	—	+	—
C. lophos (Herbst)	—	—	—	+	—
Charybdis annulata (Fabr.)	—	—	—	+	—
Carpilius convexus (Forsskål)	—	—	—	+	—
Actaedoes tomentosus (Milne-Edwards)	—	—	—	+	—
Dorippe facchino (Herbst)	—	—	+	+	+
D. frascone (Herbst)	—	—	+	+	+
Doclea hybrida (Fabr.)	—	—	+	+	+
Grapsus albolineatus Lam.	—	+	+	+	—
Heteropilumnus angustifrons Alcock	—	—	—	+	—
Matuta lunaris (Forsskål)	—	—	—	+	—
Scylla serrata (L.)	—	—	+	+	—
Pachygrapsus planifrons De Man	—	+	+	+	—
Pinnotheres tenuipes Bürger	—	—	—	+	+
Pseudozius caystrus (Ad. & Wh.)	—	—	—	+	—
Sesarma spp.	—	+	+	+	+
Shaerozius nudus (Milne-Edw.)	—	—	—	+	—
Ocypode cordimanus Desmarest	—	+	+	—	—
O. platytarsus Milne-Edw.	—	+	+	—	—
Uca (*Celuca*) *lactea annulipes* (Milne-Edwards)	—	+	+	—	—
: MOLLUSCA : SOLENOGASTRES : APLACOPHORA :					
Choetoderma sp.	—	—	+	—	—

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
: POLYPLACOPHORA (=LORICATA)					
Craspidochiton laquetns (Sowerby)	—	—	—	+	+
Acanthochitona mahensis Winckworth	—	—	—	+	+
Ischnochiton herdmani Sykes	—	—	—	+	+
I. aequigranuiatus von Knorre	—	—	—	+	+
Schizochiton incisus Sowerby	—	—	—	+	+
: GASTROPODA : PROSOBRANCHIA :					
Haliotis varia L.	—	—	—	+	+
Diodora singaporensis (Reeve)	—	—	—	+	+
D. lima (Sowerby)	—	—	—	+	+
Emarginula planulata Abams	—	—	—	+	+
E. incisura Adams	—	—	—	+	+
Scutus unguis (L.)	—	—	—	+	+
Cellana radiata (Börn)	—	—	—	+	+
Calliostoma tranquebaric ı (Röding)	—	—	—	+	+
Gibbula pulcherrima Adams	—	—	—	+	+
Cantharidus interruptus (Wood)	—	—	—	+	+
Clanculus microdon Adams	—	—	—	+	+
Trochus pustolusus Philippi	—	—	—	+	+
T. maculatus Lam.	—	—	—	+	+
T. obesus Reeve	—	—	—	+	+
T. stellatus Gmelin	—	—	—	+	+
Mouilea solandri (Philippi)	—	—	+	+	—
Umbonium vesti· rum (L.)	—	—	+	+	+
Turbo argyrostoma L.	—	—	+	+	+
Astraea semicostata (Kiener)	—	—	—	+	+
Nerita htstrio L.	—	—	—	+	+
N. plicata L.	—	—	—	+	+
N. polita L.	—	—	—	+	+
N. rumphii Récluz	—	—	—	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
N. chameleon L.	—	—	—	+	+
N. squamulata Le Guillon	—	—	—	+	+
Neritina oualaniensis Lesson	—	—	—	+	+
Littorina glabrata Philippi	—	—	+	+	+
L. scabra L.	—	—	+	+	+
Rissoina clathrata Adams	—	—	—	+	+
Turritella acutangulo (L.)	—	—	+	+	+
T. attenuatta Reeve	—	—	+	+	+
Architectonica perspectiva (L.)	—	—	+	+	+
Torinia dorsuosa (Hinds)	—	—	+	+	+
Vermetus spp.	—	—	—	+	—
Vermicularia inopertus (Rüppell)	—	—	—	+	+
Cerithidea fluviatilis (Potièz & Michaud)	—	—	—	+	+
Cerithium morus Lam.	—	—	+	+	+
C. scabridium Philippi	—	—	+	+	+
C. splendens Sowerby	—	—	+	+	+
C. rugosum Wood	—	—	+	+	+
C. trailii Sowerby	—	—	+	+	+
Triphora corrugata (Hinds)	—	—	+	+	+
T. violacea (Quoy & Gaimard)	—	—	+	+	+
Janthina globosa Swainson	—	—	—	+	—
Calyptraea extinctorium Lam.	—	—	+	+	+
Xenophora corrugata (Reeve)	—	—	+	+	+
Strombus dentatus L.	—	—	+	+	—
S. marginatus L.	—	—	+	+	—
Pterocera lambis (L.)	—	—	+	+	—
Natica marochiensis Gmelin	—	—	+	+	+
Natica tigrina (Röding)	—	—	+	+	+
N. ala-papilionis (Röding)	—	—	+	+	+
Polynices mamilla (L.)	—	—	+	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Sinum planulatum (Récluz)	—	—	+	+	+
Cypraea argus L.	—	—	+	+	—
C. caput-serpentis L.	—	—	+	+	—
C. tigris L.	—	—	+	+	—
C. ocellata L.	—	—	+	+	—
C. moneta L.	—	—	+	+	—
C. arabica L.	—	—	+	+	—
Ovulum formosum Adams & Reeve	—	—	+	+	—
Phalium areola (Lam.)	—	—	+	+	+
Cassis rafa Lam.	—	—	+	—	—
Cymatium cingulatum (Lam.)	—	—	+	+	+
Bursa spinosa (Lam.)	—	+	+	+	+
Murex trapa Röding	—	—	+	+	+
M. ramosus L.	—	—	+	+	+
M. aculeatus Lam.	—	—	+	+	+
Drupa tuberculata (Blainville)	—	—	+	+	+
Marginella dens Reeve	—	—	+	+	+
Vasum cornigera (L.)	—	—	+	—	—
Phos roseatus Hinds	—	—	+	—	—
Thais bufo (Lam.)	—	—	+	—	—
T. rugosa (Börn)	—	—	+	+	+
Pyrene versicolor (Sowerby)	—	—	+	+	+
Engina trifasciata Melvill	—	—	+	+	+
E. zonata (Reeve)	—	—	+	+	+
Babylonis spirata (L.)	—	—	+	—	—
Hemifusus pugilinus (Born)	—	—	+	—	—
Bullia melanoides (Deshayes)	—	—	+	+	+
Nassa echiuata Adams	—	—	+	+	+
N. granifera Kiener	—	—	+	+	+
N. ornata Kiener	—	—	+	+	+

TABLE 1. (*Continued*)

Sepcies / Niche	1	2	3	4	5
Peristernia pulchella (Reeve)	—	—	+	+	+
Fasciolaria filamentosa Lam.	—	—	+	—	—
Fusinus toreuma (Lam.)	—	—	+	—	—
Oliva gibbosa (Börn)	—	—	+	—	—
O. oliva (L.)	—	—	+	—	—
Mitra acuminata Swainson	—	—	+	—	—
M. insculpta Adams	—	—	+	—	—
Xancus pyrum (L.)	—	—	+	—	—
Harpa conoidalis Lam.	—	—	+	—	—
Turris tigrina (Lam.)	—	—	+	+	+
Turricula tornata (Dillwyn)	—	—	+	+	+
Conus acuminatus Bruguière	—	—	+	+	+
C. lividus Hwass	—	—	+	+	+
C. coronatus Dillwyn	—	—	+	+	+
Rhizoconus lineatus Chemnitz	—	—	+	+	+
Lithoconus eburneus Hwass	—	—	+	+	+
Conus zonatus Hwass	—	—	+	+	+
Duplicaria duplicate (L.)	—	—	+	+	+
Terebra subulata (L.)	—	—	+	+	+
T. crenulata L.	—	—	+	+	+
T. comaticulata Gmelin	—	—	+	+	+
Ficus ficus (L.)	—	—	+	—	—
Pustularia icercula (L.)	—	—	+	—	—
: OPISTHOBRANCHIA :					
Pupa tesselata Reeve	—	—	+	+	+
Hydatina velum (Gmelin)	—	—	+	+	+
Bulla ampulla L.	—	—	+	+	—
Atys cylindricus (Helbling)	—	—	+	—	—
Microhedyle spp.	+	—	—	—	—
Parhedyle spp.	+	—	—	—	—

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Aplysia benedicti Eliot	—	—	—	+	+
A. corigera Sowerby	—	—	—	+	+
A. lineolata Adams & Reeve	—	—	—	+	+
Dolabella rumphii Cuv.	—	—	+	+	+
Polybrachia orietalis (Kelaart)	—	—	—	+	+
Elysia grandifolia Kelaart	—	—	—	+	+
Euseleops winckworthi Satyamurti	—	—	+	+	+
Marionia pambanensis O'Donoghue	—	—	+	+	+
Armina paucidentata (O'Donoghue)	—	—	+	+	+
Glossodoris humberti (Kelaart)	—	—	+	+	+
Chromodoris pustulana (Börn)	—	—	+	+	+
Discodoris pardalis (Alder & Hancock)	—	—	+	+	+
Dendrodoris indica Stimpson	—	—	+	+	+
Notodoris gardineri Smith	—	—	+	+	+
Doto indica Stimpson	—	—	—	+	+
Trippa ornata Börn	—	—	—	+	+
Thordista crosslandi Eliot	—	—	+	+	+
Eubranchus proluctus (Farran)	—	—	+	+	—
Hervia ceylonica Farran	—	—	+	+	+
Phylliroe spp.	—	—	—	+	—
Pseudovermes salamandrops Marcus	—	—	+	+	+
Glaucus marinus (Dupont)	–	–	–	+	–
Siphonaria stellata (Helbling)	–	–	–	+	+
Onchidium verruculatum Cuv.	—	—	+	+	+
: SCAPHOPODA : DENTALIIDAE :					
Dentalium octangulatum Donovan	–	–	+	–	–
D. manaarense Winckworth	–	–	+	–	–
: LAMELLIBRANCHIA : TAXODONTA :					
Arca inaequivalvis Bruguière	—	—	+	—	—

TABLE 1. (*Continued*)

Species/Niche	1	2	3	4	5
: DYSODONTA :					
Limopsis belcheri (Adams & Reeve)	—	—	+	+	+
Modiolus perfragilis (Duncker)	—	—	+	+	+
M. trailii (Reeve)	—	—	+	+	+
M. arborescens Chemnitz	—	—	+	+	+
M. modiolus (L.)	—	—	+	+	+
M. tulipa (Lam.)	—	—	+	+	+
M. argentea Reeve	—	—	+	+	+
Musculus nana (Duncker)	—	—	+	+	+
Lithophaga gracilis (Philippi)	—	—	+	+	+
L. cinnamonea (Lam.)	—	—	+	+	+
Perna legumen (Gmelin)	—	—	+	+	+
P. viridis (L.)	—	—	+	+	+
Malleus malleus (L.)	—	—	+	+	+
Pteria chinensis (Leach)	—	—	+	+	+
Pinctada margaritifera (L.)	—	—	—	+	—
P. vulgaris (Schumacher)	—	—	—	+	+
Pinna bicolor Gmelin	—	—	+	+	+
P. muricata (L.)	—	—	+	+	+
P. serrata Solander	—	—	+	+	+
: PSEUDOLAMELLIBRANCHIA :					
Pecten tranquebaricus (Gmelin)	—	—	+	+	—
P. (Chlamys) crassicostatus Sowerby	—	—	+	+	—
P. (C.) irregularis Sowerby	—	—	+	+	—
Semipecten forbesianus Adams & Reeve	—	—	+	+	—
Spondylus imperialis Chenu	—	—	+	+	—
Lima inflata Chemnitz	—	—	+	+	—
L. fragilis Chemnitz	—	—	+	+	+
Placenta placenta (L.)	—	—	+	+	—
Ammusium paucilirata Smith	—	—	+	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
: OSTRAEIFORMES :					
Ostrea forsskali Gmelin	—	—	—	+	+
O. madrasensis Preston	—	—	—	+	+
: EULAMELLIBRANCHIA :					
Cardita bicolor Lam.	—	—	+	—	—
Lucina edentula (L.)	—	—	+	—	—
L. vesicula Gould	—	—	+	—	—
Divaricella cumingii (Adams & Angas)	—	—	+	—	—
Codakia divergens (Philippi)	—	—	+	—	—
Chama imbricata Broderif	—	—	—	+	+
Pseudochama cristella (Lam.)	—	—	—	+	+
Cardium asiaticum Brugière	—	—	+	—	—
C. papyracea Chemnitz	—	—	+	—	—
C. maculosum Wood	—	—	+	—	—
Tridacna tridacna L.	—	—	+	+	—
T. cummingii Reeve	—	—	+	+	—
Circe scripta (L.)	—	—	+	—	—
Gafrarium tumidum Röding	—	+	+	—	—
G. dispar (Chemnitz)	—	+	+	—	—
Meretrix casta (Chemnitz)	—	+	+	—	—
Pitar alabastrum (Reeve)	—	+	+	—	—
Sunetta scripta (L.)	—	+	+	—	—
Dosinia cretacea (Reeve)	—	+	+	—	—
Venus reticulata L.	—	+	+	—	—
Antigona lamellaris Schumacher	—	—	+	—	—
Chione calophylla (Philippi)	—	—	+	+	—
Venerupis macrophylla Deshayes	—	—	+	+	—
Paphia ala-papiliones Röding	—	+	+	—	—
Mesodesma trigona Deshayes	—	+	+	—	—
Mactra cuneata Chemnitz	—	+	+	—	—

TABLE 1. (*Continued*)

Species/Niche	1	2	3	4	5
M. violacea Chemnitz	—	+	+	—	—
Lutrarir philippinarum Deshayes	—	—	+	—	—
Donax cuneatus L.	—	—	+	—	—
D. aperittus Melvill	—	—	+	—	—
Psammobia bipartita Philippi	—	—	+	—	—
Tellina angulata Gmelin	—	+	+	—	—
T. pristis Lam.	—	+	+	—	—
T. rugosa Börn	—	+	+	—	—
Siliqua radiata (L.)	—	+	+	—	—
Solen lamarckii Deshayes	—	—	+	—	—
S. annandale Preston	—	—	+	—	—
Cultellus maximus (Gmelin)	—	—	+	—	—
Corbula modesta Hinds	—	—	+	—	—
Gastrochaena gigantea (Deshayes)	—	—	+	—	—
Pholas orientalis Gmelin	—	—	+	+	+
Martesia striata (L.)	—	—	—	—	+
Laterula anatina (L.)	—	—	+	—	—
: SEPTIBRANCHIA :					
Cuspidaria elegans Hinds	—	—	+	—	—
: CEPHALOPODA ; OCTOPODA :					
Octopus hongkongensis Hoyle	—	—	—	+	+
O. rugosus (Bosc)	—	—	—	+	+
O. arborescens Hoyle	—	—	—	+	+
O. horridus (d'Orb.)	—	—	—	+	+
O. cyaneus Gray	—	—	—	+	+
O. fusiformis Brock	—	—	—	+	+
O. macropus Risso	—	—	—	+	+
Cistopus indicus (Férussac et d'Orb.)	—	—	—	+	+
: ECHINODERMATA : CRINOIDEA : ARTICULATA :					
Comatula pectinato (L.)	—	—	—	+	+
Capillaster multiradiata (L.)	—	—	—	+	+
Amphimetra milberti (J. Müller)	—	—	—	+	+
Dichrometra palmata (J. Müller)	—	—	—	+	+
Tropiometra encrinus (Lütken)	—	—	—	+	+
Antedon indica Carpenter	—	—	—	+	+
Iridometra nana (Hartlaub)	—	—	—	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
: HOLOTHUROIDEA : DENDROCHIROTA :					
Calochirus violaceus Theel	—	—	+	—	—
Cucumaria echinata Marenzeller	—	—	+	—	—
C. imbricata (Semper)	—	—	+	—	—
C. ardens Koehler & Vaney	—	—	+	—	—
Psolus monacaria Lesson	—	—	+	—	—
: ASPIDOCHIROTA :					
Holothuria atra Jäeger	—	—	+	—	—
H. edulis Lesson	—	—	+	—	—
H. impatiens Forsskål	—	—	+	—	—
H. pardalis Selenka	—	—	+	—	—
H. kurti Lampert	—	—	+	+	—
H. billa Lesson	—	—	+	—	—
H. marmorata (Jäeger)	—	—	+	+	+
H. scabra Jäeger	—	—	+	+	+
Actinopyga mauritiana (Quoy & Gaimard)	—	—	+	+	—
Stichopus variegatus Semper	—	—	+	—	—
Thelenota ananas (Jäeger)	—	—	+	—	—
Microthele nobilis (Selenka)	—	—	+	—	—
: MOLPADONIA :					
Haplodactyla molpadioides Semper	—	—	+	—	—
: APODA :					
Synapta maculata (Cham. & Eysen.)	—	—	+	—	—
Chiridota rsfuscens Brandt	—	—	+	—	—
: ASTEROIDEA : PHANEROZONIA : PAXILLOSA :					
Astropecten indicus Döderlein	—	—	+	+	—
A. monacanthus Sladen	—	—	+	+	+
A. polyacanthus Müller & Troschel	—	—	+	+	—
A. nobilis Koehler	—	—	+	+	—
A. pugnax Koehler	—	—	+	—	—
Lurdia limbata (Sladen)	—	—	+	+	+
L. maculata Müller & Troschel	—	—	+	+	+
: VALVATA :					
Archaster typicus Müller & Troschel	—	—	+	—	—
Craspidaster hesperus (M. & Tr.)	—	—	+	—	—
Goniodiscus forficulatus Perrier	—	—	+	—	—
Stellaster incei Gray	—	—	+	—	—

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Pentaceros regulus (M. & Tr.)	—	—	+	—	—
P. iudicus Koehler	—	—	+	—	—
P. superbus Möbius	—	—	+	—	—
Asterina cephea (Müller & Troschel)	—	—	+	—	—
A. exigua (Lam.)	—	—	+	—	—
A. lorioli Koehler	—	—	+	—	—
: ECHINOIDEA : REGULARIA : AULODONTA :					
Astropyga radiata (Leske)	—	—	+	—	—
: STIRODONTA :					
Stomopneustes variolarius (Lam.)	—	—	+	+	+
: CAMARODONTA :					
Temnopleurus torematicus (Klein)	–	–	+	+	+
Salmacis bicolor Agassiz	–	–	+	+	+
S. virgulata Agassiz	–	–	–	+	+
S. roseo-viridis Koehler	–	–	–	+	+
Tripneustes gratilla (L.)	–	–	–	+	+
Heterocentrotus mammillatus (L.)	–	–	–	+	+
Echinometra mathaei (Blainville)	–	–	–	+	+
: IRREGULARIA : CASSIDVLOIDA :					
Echinolampus ovatus (Leske)	–	–	+	–	–
: CLYPEASTROIDA :					
Clypeaster annandalei Koehler	–	–	+	+	–
C. humilis (Leske)	–	–	+	–	–
C. rarispinus (Meijérè)	–	–	+	+	–
Echinocyamus crispus Mazetti	–	–	+	–	–
Fibularia volvo Agassiz & Desor	–	–	+	+	–
Lagenum decagonale (De Blainville)	–	–	+	+	–
L. depressum (Lesson)	–	–	+	+	–
Echinodiscus auritus (Leske)	–	–	+	–	–
E. biperforatus (Leske)	–	–	+	–	–
: SPATANGOIDA :					
Pseudomaretia alta (Agassiz)	–	–	+	+	–
Lovenia elongata (Gray)	–	–	+	+	–
Brissopsis luzonica (Gray)	–	–	+	–	–
Metalia maculosa (Gmelin)	–	–	+	–	–
: OPHIUROIDEA : OPHIURAE :					
Ophiomyxa brevispina Martens	–	–	+	+	+

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Ophiacantha decora Koehler	–	–	+	+	+
O. vagans Koehler	–	–	+	+	+
Amphiura duncani Loriol	–	–	+	+	+
Amphiopholis squamta (Della Chiaje)	–	–	+	+	+
Ophiocnida echinata (Ljungman)	–	–	+	–	–
Ophiactis affinis Duncan	–	–	+	+	+
Ophiolepis rugosa Koehler	–	–	+	+	+
Ophiura (Ophioglypha) sinensis Lyman	–	–	+	+	+
Ophiothela danae Verrill	–	–	+	+	+
Ophiothrix comata Müller & Troschel	–	–	+	+	+
O. nereidina (Lam.)	–	–	+	+	+
O. speciosa Koehler	–	–	+	+	+
O. trilineate Lütken	–	–	+	+	+
Ophiocoma brevipes Peters	–	–	+	+	+
O. scolopendrine Agassiz	–	–	+	+	+
Ophiocomella sexradiata (Duncan)	–	–	+	+	+
Ophiomastix annulosa (Lam.)	–	–	+	+	+
Ophiarthrum pictum (Müller & Troschel)	–	–	+	+	+
Pectinura gorgonia (M. & Tr.)	–	–	+	+	+
Ophionereis porrecta Lyman	–	–	+	–	+
: CHORDATA : HEMICHORDA :					
Balanoglossus carnosus (Willey)	–	–	+	–	–
Ptychodera flava Eschscholtz	–	–	+	–	–
P. viridis Punnett	–	–	+	–	–
: TUNICATA : ASCIDIACEA :					
Ecteinascidia bombayensis Das	–	–	–	+	+
E. thurstoni Herdman	–	–	–	+	+
Herdmania pallida Lahille	–	–	–	+	+
H. ennurensis Das	–	–	–	+	+
Styela areolata Heller	–	–	–	+	+
Ascidiella aspersa (O. F. Müller)	–	–	–	+	+
Polyclinum indicum Sebastian	–	–	–	+	+
Phallusia mammillata (Cuv.)	–	–	–	+	+
Glossophorum indicum Das	–	–	–	+	+
Perophora spp.	–	–	–	+	+
: THALIACEA :					
Pyrosoma atlanticxm Péron	–	–	–	+	–

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
Doliolum nationalis Borgert	–	–	–	+	–
D. (*Dolioletta*) *gegenbauri* Uljanin	–	–	–	+	–
Salpa (*Iasis*) *zonaria* (Pallas)	–	–	–	+	–
: LARVACEA :					
Oikopleura dioica Fol	–	–	–	+	–
: CEPHALOCHORDA :					
Amphioxus (*Branchiostoma*) spp.	–	–	+	+	–
: PISCES : CHONDRICHTHYES : TORPEDINIFORMES :					
Narcine brunnea Annandale	–	–	+	+	–
N. timlei (Bloch & Schneider)	–	–	+	+	–
: OSTEICHTHYES : ANGUILLFORMES :					
Anguilla bicolor bicolor Mc Clelland	–	–	–	+	–
A. bengalensis bengalensis (Gray & Hardwicke)	–	–	–	+	–
Echidna nebulosa (Ahl)	–	–	–	+	+
E. delicatula (Kaup)	–	–	–	+	+
Gymnothorax reticularis Bloch	–	–	–	+	+
G. pseudothyrsoidea (Bleeker)	–	–	–	+	+
Sideria picta (Ahl)	–	–	–	+	+
Uropterygius marmoratus (Lacépède)	–	–	–	+	+
Urocongor lepturus (Richardson)	–	–	–	+	+
Conger cinereus Rüppell	–	–	–	+	+
Ophichthys apicalis (Bennett)	–	–	+	–	–
O. altipiunis (Kaup)	–	–	+	–	–
: SILURIFORMES :					
Plotosus limbatus Val.	–	–	+	+	–
: ATHERINIFORMES :					
Hemirhamphus lutkei Val.	–	–	+	+	–
Hyporhamphus affinis (Günther)	–	–	–	+	–
: SYNGNATHIFORMES :					
Fistularia petimba Lacépède	–	–	–	+	–
Centriscus scutatus L.	–	–	–	+	–
Ichthyocampus carce (Hamilton-Buchanan)	–	–	–	+	–
Urocampss southwelli Duncker	–	–	–	+	–
Hippocampus kuda Bleeker	–	–	–	+	–
: SCORPAENIFORMES :					
Platycephalus scaber (L.)	–	–	+	+	–

TABLE 1. (*Continued*)

Species / Niche	1	2	3	4	5
P. crocodilus Tilesius	–	–	+	+	–
Pterois volitans (L.)	–	–	–	+	+
P. *miles* Bennett	–	–	–	+	+
Scorpaenodes gaumensis (Quoy & Gaimard)	–	–	–	+	+
Parascorpaena erostris (Alcock)	–	–	–	+	+
P. bleekeri (Day)	–	–	–	+	+
P. picta (Cuv.)	–	–	–	+	+
P. armata (Sauvage)	–	–	–	+	+
Choridactylus multibarbus Richardson	–	–	–	+	+
Minous monodactylus (Bloch & Schneider)	–	–	–	+	+
: PERCIFORMER :					
Ambassis commersoni Cuv.	–	–	–	+	–
A. gymnocephalus (Lacépède)	–	–	–	+	–
A. interruptus Bleeker	–	–	–	+	+
Epinephelus areolacus (Forsskål)	–	–	–	+	+
E. flavocaerulus (Lacépède)	–	–	–	+	+
E. tauvina (Forsskål)	–	–	–	+	+
Pelates quadrilineatus (Bloch)	–	–	–	+	+
Terapon jarbua (Forsskäi)	–	–	–	+	+
T. theraps Cuv.	–	–	–	+	+
Apogonichthys ellioti (Day)	–	–	–	+	+
Apogon enneastigma (Rüppell)	–	–	–	+	+
A, quadrifasciatus Cuv.	–	–	–	+	+
Sillago maculata Quoy & Gaimard	–	+	+	–	–
S. sihama (Forsskål)	–	+	+	–	–
Pseudochromis fuscus M. & Tr.	–	–	–	+	+
Uranoscopus fuscomacnlatus Kner	–	–	+	+	+
Jchthyoscopus lebeck (Bloch)	–	–	+	+	+
Blenniches breviceps Cuv.	–	–	–	+	+
Salarias leoparpus Day	–	–	–	+	+
Istiblennius unicolor (Rüppell)	–	–	–	+	+
Dascyllus trimaculatus (Rüppell)	–	–	–	+	+
Cheiloprion labiatus (Day)	–	–	–	+	+
Abudefduf septumfasciatus (Cuv.)	–	–	–	+	+
Coris gaimardi (Quoy & Gaimard)	–	–	–	+	+
Aprion virescens Val.	–	–	–	+	+
Paracaesio sordidus Ade & Shinohara	–	–	–	+	+

TABLE 1. (*Concluded*)

Sepcies / Niche	1	2	3	4	5
O. erythrogaster Cuv.	–	–	–	+	–
Gerres abbreviatus Bleeker	–	–	–	+	+
G. filamentosus Cuv.	–	–	–	+	+
G. oblongus Cuv.	–	–	–	+	+
Pomadasys hasta (Bloch)	–	–	–	+	+
Scatophagus argus (L.)	–	–	–	+	+
Parachaetodon ocellatus (Cuv.)	–	–	–	+	+
Chaetodon vagabundus L.	–	–	–	+	+
C. trifasciatus Mungo Park	–	–	–	+	+
Liza parsia (Ham.-Buch.)	–	–	–	+	+
Mugil cephalus L.	–	–	–	+	+
Ctenochaetus strigosus (Bennett)	–	–	–	+	+
: GOBIESOCIFORMES :					
Eleotriodes muralis (Val.)	–	–	–	+	+
Gobiodon citrinus (Rüppell)	–	–	–	+	+
Stenogobius malabaricus (Day)	–	–	–	+	+
Oxyurichthys microlepis (Bleeker)	–	–	–	+	+
O. tentacularis (Val.)	–	–	–	+	+
Oottogobius bilobatus Koumans	–	–	–	+	+
Glossogobius biocellatus (Val.)	–	–	–	+	+
Acentrogobius ornatus (Rüppell)	–	–	–	+	+
Mugilogobius valigouva (Deriyanagala)	–	–	–	+	+
Stigmatogobius javanicus (Bleeker)	–	–	–	+	+
Parapocryptes macrolepis (Bleeker)	–	–	–	+	+
: TETRAODONTIFORMES :					
Triacanthus brevirostris Schlegel	–	–	–	+	+
Lactoria cornuta (L.)	–	–	–	+	+
Ostracion tuberculata L.	–	–	–	+	+
Tetrosomus gibbosus (L.)	–	–	–	+	+
Abalistes stellaris (Bloch)	–	–	–	+	+
Diodon hystrix L.	–	–	–	+	+
Tetradon inermis Temminck & Schlegel	–	–	–	+	+
: BATRACHOIDIFORMES :					
Halophryne dussumieri (Val.)	–	–	–	+	+
H. gangene (Hamilton)	–	–	–	+	+
: LOPHIIFORMES :					
Histrio histrio (L.)	–	–	–	+	+
Antennarius commersoni (Cuv.)	–	–	–	+	+
A. leprosus Eydoux & Souleyet	–	–	–	+	+
A. hispidus (Bloch)	–	–	–	+	+
: REPTILIA : OPHIDIA :					
Hydrophis cantoris Günther	–	–	–	+	+
Microcephalopholis gracilis Shaw	–	–	–	+	+

TABLE 2. Contribution of species by each major group to the population of the inter-tidal zone.

	Major Group	No. of species
FLORA :	Diatomacea	14
	Chlorophyceae	9
	Phaeophyceae	6
	Rhodophyceae	15
	Cyanophyceae	1
FAUNA :	Protozoa	43
	Porifera	19
	Coelenterata	48
	Platyhelminthes	19
	Aschelminthes	49
	Entoprocta	2
	Annelida	53
	Echiuroidea	1
	Sipunculida	5
	Brachiopoda	1
	Phoronida	1
	Chaetognatha	2
	Ectoprocta	15
	Arthropoda	105
	Mollusca	227
	Echinodermata	88
	Hemichorda	3
	Tunicata	15
	Cephalochorda	1
	Pisces	95
	Reptilia	5
	Aves	16
	TOTAL	858 species