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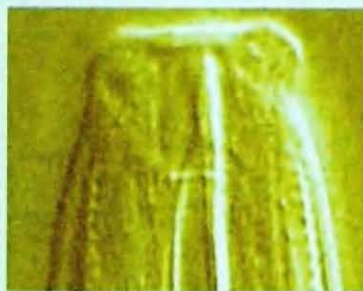
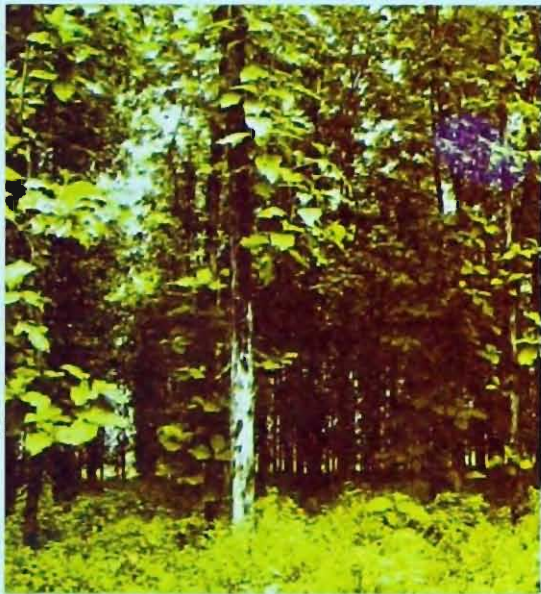
**Intertidal Macrofauna of
Subarnarekha Estuary
(Balasore : Orissa)**

**SANTANU MITRA
A. MISRA
J.G. PATTANAYAK**



ZOOLOGICAL SURVEY OF INDIA

Nematodes Associated with Insect Pests and Soil of Teak and Sal Forests of Dehra Dun, Uttarakhand, India



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**RECORDS OF THE
ZOOLOGICAL SURVEY OF INDIA**

**INTERTIDAL MACROFAUNA OF
SUBARNAREKHA ESTUARY
(BALASORE : ORISSA)**

***SANTANU MITRA
A. MISRA
J.G. PATTANAYAK**

Zoological Survey Of India, F.P.S. Building, 27 J.L. Nehru Road, Kolkata - 700016

**E-mail : santanuzsi@gmail.com*

Edited by the Director, Zoological Survey of India, Kolkata



**Zoological Survey of India
Kolkata**

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INTRODUCTION

Estuaries are highly productive habitats due to its continuous replenishment of nutrients from both the sea side and from landside brought to riverine waters carried in the form of silt, clay and organic matter. They also serve as breeding and spawning ground for several commercially important fin fishes and shell fishes and also act as a nursery for several invertebrates of adjoining sea (Rao, 2004). There are about 113 major and minor estuarine ecosystems in India, which are intersected by several rivers, streams, canals, creeks and eventually backwaters, also create an estuarine environment. Most of the major estuaries (Hugli-Matla estuary, Mahanadi estuary, Rushikulya estuary, Basishtha-Godavari estuary, Krishna estuary and Vellar estuary) of the east coast were investigated in respect of the faunal diversity, but the intertidal fauna of estuarine environment were less explored.

Intertidal fauna is an important component of marine and estuarine ecosystem, which consists of bio-active compounds used in medicines. Most of those species act as an important link of marine food webs and feed for many demersal fishes. Based on the abundance and diversity of macrofauna by periodical environmental monitoring, health of the estuaries can be assessed. The study of the intertidal benthic fauna having comparatively less motility depict not only the present condition but also the past condition of their habitat. Further the intertidal area is easily accessible than all other marine and estuarine habitats. Therefore macrobenthic fauna of the intertidal areas throughout the world has received a considerable attention in recent years.

In Indian context, estuarine macrozoobenthos and their ecology was worked out in our country by Untawale and Parulekar, 1976; Bhunia and Choudhury, 1981; Govindan *et al.*, 1983; Choudhury *et al.*, 1984a.; Choudhury *et al.*, 1984b; Chakraborty and Choudhury, 1985; Misra and Barua, 1987; Fernando, 1987; Patra *et al.*, 1988; Patra *et al.*, 1990; Chakraborty and Choudhury, 1992b; Chakraborty and Choudhury, 1992a; Nandi and Choudhury, 1993; Anthalye and Gokhale, 1998 and very recently by Khan, 2008.

Among the major estuaries in Orissa, faunal diversity was reported from Brahmani-Baitarani estuary, Burhabalanga estuary, Rushikulya estuary (Director, ZSI (Ed.) 1992), Mahanadi estuary (Director, ZSI (Ed.) 1998) and Bahuda estuary.

But till to day there is no any comprehensive report on the intertidal macrofauna of any estuarine ecosystem from India.

The subarnarekha estuary situated almost in the eastern part of the Orissa coast bordering West Bengal. This estuary comprises all microhabitats of the estuarine ecosystem that is, tidal mud flat, sandy beach, patchy mangroves, marshland, soft mud along the narrow creeks etc. Most of the estuaries of the eastern coast of India

were studied well in respect of faunal diversity, but till date there is no detail information on the faunal resources of this estuary. Despite of Anthropogenic pressure and various types of fishing activities, this estuary is rich in faunal diversity. The authors investigated the Intertidal macro faunal resources of this area during the period of 2006-2008. This survey results a remarkable faunal composition in the intertidal area of the estuary with distinct zonation. Previously Goswamy (1992) reported some marine fauna of Digha coast, which is very nearer to this estuary. Rao & Misra (1986) reported the Macrofauna of Digha Beach of West Bengal. Chatterjee & Mitra (2003) reported the Estuarine Molluscs of Talsari. Mitra and Misra (2006) reported 106 species of Intertidal Macrofauna from the Talsari, a part of the Subarnarekha estuary.

Subarnarekha estuary is exploited in several ways due to anthropogenic loading. Collection of post larvae of Tiger prawn causes a massive destruction of larvae and juveniles of many invertebrates and vertebrates including polychaetes which, ultimately disturbs the community. Establishment of fishing harbour at Talsari and Kirtania may have chances to lead a habitat destruction of many valuable species dwells in the intertidal area. Talsari is a popular tourist spot of this estuary, attracted by tourists and local fishermen. In this context, a detail study will help us to know the present status of the macrozoobenthos diversity of intertidal area of this estuary.

The present paper based on a project undertaken on 2006 to 2008. Four survey were conducted, a huge amount of intertidal macrofauna were collected and after the detail taxonomical studies reveals a comprehensive list comprising 162 species of Intertidal macrobenthic fauna (Table-1) from this estuarine ecosystem.

During the survey periods the authors observed the avifauna of this area and a comprehensive list of the birds of this area are given in Appendix-1, as the birds are considered as an indicator of the physical and biological resources of an ecosystem.

TOPOGRAPHY

(Plate I. A-F)

The Subarnarekha is one of the major rivers of eastern coast of India. After originating from the Ranchi plateau of Jharkhand state is flows over 477 km distance covering three states of India and lastly enters in Bay of Bengal at the extreme north eastern part of Orissa (Latitude $21^{\circ}34'$ - $21^{\circ}37'$ and Longitude $87^{\circ}20'$ - $87^{\circ}27'$), forming an estuarine complex composed of mangrove trees, bushes, salt marshes, mudflats and sandy beaches (Fig. 1).

The river in monsoon freshets, debouch a large amount of sediments at the sea face and subsequently the sediments are pushed to the east along the shore parallel locations with long shore drift current. Thus various sand bars have already emerged at the sea face and the deltaic flats advanced sea ward in a south and east ward direction. Since 1930 this delta has advanced 3.5 km to the seaward direction with the accumulation of the submerged bars, emerged bars and formation of an offshore bar parallel to the earlier shore line. The bar is extending from the eastern bank of

Subarnarekha river mouth to Talsari. A lagoonal flat is developed at the back side of the linear bar under a sheltered environment. An extensive saline wetland is developed over 11.5 sq. km areas under lagoonal setting around the eastern side of the Subarnarekha estuary mouth. The entire wetland is usually flooded in every high tide. Tidal mudflat is also extensive over the region of tidal spill basin that provided an ideal ground for colonization of opportunist mangrove, which are dominated by *Avicennia officinalis* (Sada bain), *A. alba* (kala bain) and *Acanthus ilicifolious*. Beside this *Aegialitis rotundifolia* (satai), *Ceriops tagal* (Garan), *Exoecaria agallocha* (Geon) and *Phoenix paludosa* (Hental) are also take part to form a mangrove vegetation (Pal, 2002).

Tidal mudflat is criss-crossed by number of tidal creeks, tidal passes and inlets. The eastern part of the lagoonal flat is slightly higher than western part, thus the ordinary high tide waters of the winter periods does not reaches the western side of the lagoonal flat through the Talsari tidal channel link. A salt marsh area is developed in that area which is occupied by salt tolerant species like *Salicornia brachiata* (Brahmi sak), *Saudea maritima* (Giria sak), *Aeluropus logopoides* (Nona durba) and *Porteresia coarctata* (Dhani ghas) etc. (Pal, 2002). All these habitat types provide unique estuarine complex for ecological and biological studies. Here some brief information about the collection stations are given below (Fig. 2) :



Fig. 1. Satelite map of Subarnarekha Estuary
(Source : Googleearth.com)

TALSARI : (Latitude $21^{\circ}36' 122''$ N/Longitude $87^{\circ}27' 858''$ E) : A popular sea beach, about 12 km west from Digha and 3 km towards south from Chandaneswar. This is very unique habitat for different types of Intertidal marine organisms. A broad branch of Subarnarekha River enters into sea here, as a result siltation is a continuous process resulting into extensive sandy beaches on the south, and a vast mud flat on the north with recently established mangroves. There is a large mud flat, which remains submerged during high tides. The area is criss-crossed by the canals connected to the tributaries of the river Subarnarekha at its confluence with the Bay of Bengal. A natural Mangrove cover consisting of *Sonneratia apatala*, *Exoecaria agalocha* and *Acanthus sp.*, is coming up on the south west side of the village. Recently the Govt. of Orissa constructed a fishing harbour at Talsari. A large Molluscan fishery also established on the Southeastern part of Talsari. The Intertidal beach is very much extended on eastern portion of this area, up to 600 mt of beach area are expose during low tides. Collection was made from the sandy marine zones, muddy estuarine zones, and mangrove forest zones. A vast bed of *Lingula*, both adult and juveniles in separate zones, was noticed. Among the faunal groups, *Lingula* along with associated bivalve, gastropods, polychaetes, sea anemones, sea pens, crabs, etc. were observed and collected.

KIRTANIA : (Latitude $21^{\circ}34' 337\frac{1}{2}$ N/Longitude $87^{\circ}22' 539\frac{1}{2}$ E) : Kirtania is a coastal village situated about 25 km towards south of Digha, where the main stream of the Subarnarekha River bifurcates. A large tributaries of the river opens into sea near village Kankrapal, another one proceeds towards Talsari. Collection was made from both the sandy and muddy zones.

KANKRAPAL : Kankrapal is actually a village of the fishermen community, situated just opposite to the Chandraboli village near the Kirtania. The area is approximately 22 km west of Digha. From Kirtania there is a regular Ferry service for reaching Kankrapal. During low tide a vast area is exposed on both sides of Kankrapal.

UDAYPUR : (Latitude $21^{\circ}37' 998''$ N/Longitude $87^{\circ}20' 548''$ E) : Udaypur is a coastal village near the southern most part of the Subarnarekha estuary along the West Bengal-Orissa border, intertidal area very wide, near about 600 meter. A vast crustacean belt is characterestic of this beach, the red crab inhabit here in the supralittoral area which is actually inside the casurina forest and grass belt area of the upper beaches. On the lower tidal zone large agregation of the cniderians are observed.

PANTEI : (Latitude $21^{\circ} 36' 287''$ N / Longitude $87^{\circ} 27' 687''$ E)

The uppermost reaches of the estuary where the salinity is only 5-8 ppt. Situated about 25 km from the estuary mouth (Kirtania), very low diversity was seen there, some Polychaetes, crabs and molluscs are collected from this site.

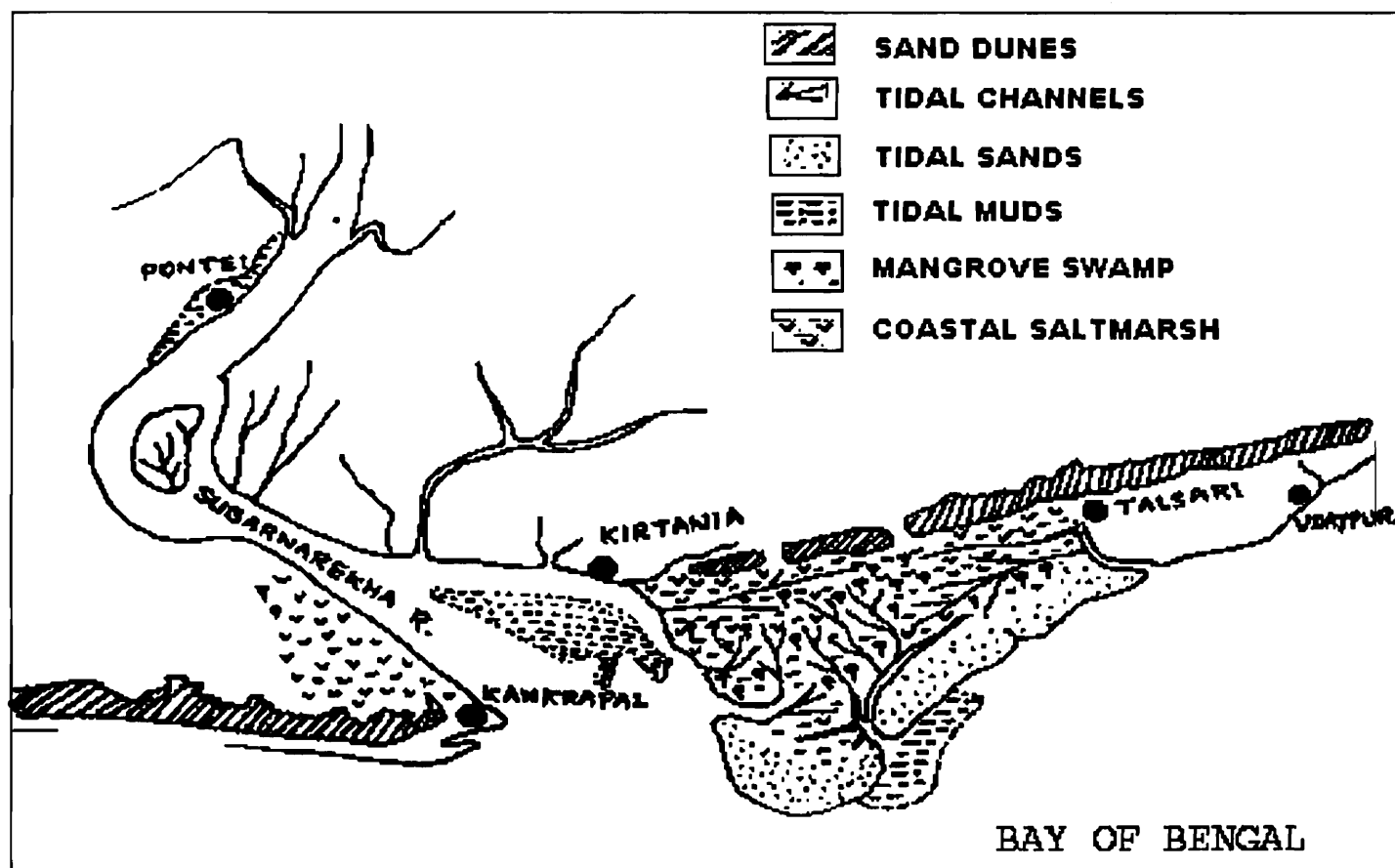


Fig. 2. Map of the Subarnarekha Estuary Showing the Collection Spots.

MATERIALS AND METHODS

The observation and collection of specimens for this study were made in different seasons during the study period 2006-2008. Surveys were made in different time and tidal conditions. Littoral fauna were collected during low tide from the sandy shore, as well as mud flat area, boulder, rocks & jetties, and also from mangrove vegetations.

During sample collection and observation, type of the substrate, abundance, habit and habitats of individual species were noted, regarding the population of polychaetes and anemones a quadrat made by iron, was used (10 cm X 10 cm X 10 cm); whereas molluscs, brachiopods and crabs are estimated by calculating their number and nest holes in 1 square meter area by using a plastic frame of 1 meter X 1 meter.

Most of this species of cnidarians, as are mud burrowing; the collection was done by inserting spade or hand into the mud without disturbing the animals and then lifting the mud along with the animals.

Formalin (1%) is quite good narcotizing agent for cnidarians. Big anemones required 6-8 hours for proper narcotisation, keeping the anemones on the bucket in saline water formalin 1% should be added 15-20 minutes interval, gradually the time of intervals would be reduced and stirring of waters should be done. This process narcotizes anemones in fully expanded condition. 10% formalin is the best preservative for these animals.

Collection of Polychaetes made during the low tide when sufficient exposure is available. Qualitative samples of polychaete fauna were collected on the intertidal regions down the shore starting from high water mark to low water mark. After the collection, the material is placed in natural sea water and then allowed to relax in 7% magnesium chloride prepared in sea water for about half an hour to avoid twisting or breaking of the specimens. Narcotization is done by addition of 70% alcohol drop by drop, slowly. Before fixation, polychaetes of the Family Phyllodocidae, Nereididae and Glyceridae are treated with sudden addition of strong alcohol for everting their pharynx. Standard fixating agent for polychaetes is 10% neutralised formalin in seawater. The most commonly used neutralising agent is borax ($\text{Na}_2\text{B}_4\text{O}_7$). Samples are kept in more or less stretched condition in formalin for 24 hours and then transferred to 70% alcohol after proper washing in fresh water for preservation. All the samples are preserved in 10% neutral seawater formalin after necessary narcotization.

Brachiopods and sipunculans were preserved in 70% Alcohol after narcotisation with propylene phenoxetol, echiurans were anesthetized by adding few crystals of menthol in the estuarine water, and preserved in 70% alcohol prior to fixation in 5% neutral formalin. Crustaceans were anesthetized with chloral hydrate or 2% formalin and then fixed in 5% buffered formalin for 3-5 days, finally preserved in 70% alcohol. Molluscs were kept in neutral formalin or as dried condition, where as echinoderms were preserved in 95% alcohol, holothurians were narcotized with menthol crystals before fixation.

Attempts were made to identify all the collected specimens up to species level whenever possible. Diagnostic features, habitat and distribution of all the species are briefly stated. Attempts also taken to photograph all the macrozoobenthos in their habitat, some species also photographed in laboratory condition. All the photographs were taken by the first author.

TABLE-1. LIST OF THE INTERTIDAL MACROFAUNA

I. Phylum CNIDARIA

Class ANTHOZOA

Subclass HEXACORALLIA

Order ACTINIARIA

Sub Order NYNATHEAE

Family EDWARDSIIDAE

1 *Edwardsia jonesii* Seshaiya & Cuttress, 1969

Family HALIACTIIDAE

2. *Pelocoetes exul* Annandale, 1915

Family DIADUMENIDAE

3. *Diadumene schilleriana* (Stoliczka, 1869)

Family ACTINIIDAE

- 4.
- Paracondylactis indicus*
- Dave, 1957

Subclass OCTOCORALLIA

Order PENNATULACIA

Family VERETILLIDAE

- 5.
- Cavernularia*
- sp.

Family VERGULARIDAE

- 6.
- Virgularia*
- sp.

II. Phylum ANNELIDA

Class POLYCHAETA

Family POLYNOIDAE

- 7.
- Lepidonotus tenuisetosus*
- (Gravier, 1901)

Family AMPHINOMIDAE

- 8.
- Chloeia parva*
- Baird, 1870

- 9.
- Chloeia rosea*
- Potts, 1909

Family PHYLLODOCIDAE

- 10.
- Eteone barantollae*
- Fauvel, 1932

- 11.
- E. ornata*
- Grube, 1878

Family TALEHSAPIIDAE

- 12.
- Talehsapia annandalei*
- Fauvel, 1932

Family NEREIDIDAE

Subfamily NAMANEREIDINAE

- 13.
- Namalycastis fauveli*
- Rao, 1981

- 14.
- Namalycastis indica*
- (Southern, 1921)

Subfamily NEREIDINAE

- 15.
- Ceratonereis burmensis*
- Monro, 1937

- 16.
- Dendronereides gangetica*
- Misra, 1998

- 17.
- Dendronereides heteropoda*
- Southern, 1921

- 18.
- Dendronereis aestuarina*
- Southern, 1921

- 19.
- Lycastonereis indica*
- Rao, 1981

- 20.
- Perinereis cultrifera*
- (Grube, 1840)

Family GLYCERIDAE

- 21.
- Glycera convoluta*
- Keferstein, 1862

22. *G. rouxii* Audouin & Milne Edwards, 1833

23. *G. tessellata* Grube, 1863

24. *G. longipinnis* Grube, 1878

Family ONUPHIDAE

25. *Diopatra cuprea* (Bosc, 1802)

26. *Onuphis eremita* Audouin & Milne Edwards, 1833

Family LUMBRINERIDAE

27. *Lumbrineris notocirrata* (Fauvel, 1932)

28. *L. heteropoda* (Marenzeller, 1879)

29. *L. polydesma* (Southern, 1921)

Family MALDANIDAE

30. *Euclymene annandalei* Southern, 1921

Family TERESELLIDAE

31. *Loimia medusa* (Savigny, 1818)

Class OLIGOCHAETA

Order HAPLOTAXIDA

Suborder LUMBRICINA

Family ACANTHODRILIDAE

32. *Pontodrilus littoralis* (Grube, 1955)

III. Phylum BRACHIOPDA

Class LINGULATA

Family LINGULIDAE

33. *Lingula anatina* Lamarck, 1801

IV. Phylum ARTHROPODA

Class CRUSTACEA

Subclass CIRRIPEDIA

Order THORACICA

Family BALANIDAE

34. *Balanus amphitrite* Darwin, 1854.

35. *Balanus* sp.

Family CHTHAMALIDAE

36. *Chthamalus stellatus* (Poli, 1791)

Subclass MALACOSTRACA

Order DECAPODA

Infraorder ANOMURA

Family DIOGENIDAE

37. *Diogenes affinis* Henderson, 1893
 38. *D. planimanus* Henderson, 1893
 39. *Clibanarius infraspinus* Hilgendorf, 1869
 40. *Clibanarius padavensis* De Man, 1888.
 41. *C. clibanarius* (Herbst, 1791)

Family COENOBITIDAE

42. *Coenobita cavipes* Stimpson, 1859

Infra order BRACHYURA

Family OCYPODIDAE

Sub Family OCYPODINAE

43. *Ocypode macrocera* H. Milne Edwards, 1837
 44. *Ocypode ceratophthalma* (Pallas, 1772)
 45. *Uca (Deltuca) rosea* (Tweedie, 1937)
 46. *Uca (Deltuca) dussumieri* (H. Milne Edwards, 1852)
 47. *Uca (Celuca) lactea* (de Haan, 1835)
 48. *Uca (Celuca) triangularis* (H. Milne Edwards, 1873)

Sub Family SCOPIMERINAE

49. *Dotilla blanfordi* Alcock, 1900
 50. *Dotilla inermis* de Man, 1888

Sub Family MACROPTHALMINAE

51. *Macrophthalmus transversus* (Latreille, 1817)
 52. *Macrophthalmus brevis* (Herbst, 1804)

Family PORTUNIDAE

53. *Scylla serrata* (Forsk., 1775)
 54. *Scylla tranquebarica* (Fabricius, 1798)

Family GRAPSIDAE

SubFamily VARUNINAE

55. *Varuna litterata* (Fabricius, 1798)

Sub Family SESARMINAE

56. *Metaplax dentipes* (Heller, 1865)
 57. *Metaplax crenulata* (Gerstaecker, 1856)
 58. *Metaplax distincta* H. Milne Edwards, 1852
 59. *Metaplax indica* H. Milne Edwards, 1852
 60. *Seasarma quadrata* (Fabricius, 1798)

Sub Family GRAPSINAE

61. *Metapograpsus messor* (Forsk. 1775)
 62. *Grapsus albolineatus* Lamarck, 1818

V. Phylum MOLLUSCA

Class GASTROPODA

Order ARCHAEOGASTROPODA

Family TROCHIDAE

63. *Umbonium vestiarius* (Linnaeus, 1758)

Family NERITIDAE

64. *Nerita (Amphinerita) articulata* Gould, 1847
 65. *Neritina (Vittina) smithi* Wood, 1828

Family VIVIPARIDAE

66. *Bellamyia bengalensis* (Lamarck, 1822)

Order MESOGASTROPODA

Family LITTORINIDAE

67. *Littorina (Littorina) undulata* Gray, 1839
 68. *Littorina (Littorinopsis) melanostoma* Gray, 1839
 69. *Littorina (Littorinopsis) scabra scabra* (Linnaeus, 1758)

Family STENOTHYRIDAE

70. *Stenothyra deltae* (Benson, 1836)

Family ASSIMINEIDAE

71. *Assiminia brevicula* (Pfeiffer, 1854)
 72. *A. beddomeana* Nevill, 1880

Family TURRITELLIDAE

73. *Turritella attenuata* Reeve, 1869

Family POTAMIDIDAE

74. *Cerithidea cingulata* (Gmelin, 1791)

75. *Cerithidea obtusa* (Lamarck, 1822)
76. *Cerithidea alata* (Philippi, 1847)
77. *Telescopium telescopium* (Linnaeus, 1758)
Family EPITONIIDAE
78. *Amaea (Acrilla) acuminata* (Sowerby, 1844)
Family NATICIDAE
79. *Natica lineata* (Roeding, 1798)
80. *N. vitellus* (Linnaeus, 1758)
81. *N. tigrina* (Roeding, 1798)
82. *Polinices (Polinices) mamilla* (Linnaeus, 1758)
83. *P. dydyma* (Roeding, 1798)
Family ARCHITECTONICIDAE
84. *Architectonica perspectiva* (Linnaeus, 1755)
Family TONNIDAE
85. *Tonna dolium* (Linnaeus, 1758)
Family BURSIDAE
86. *Bursa spinosa* (Lamarck, 1843)
87. *B. rana* (Linnaeus, 1758)
Order NEOGASTROPODA
Family MURICIDAE
88. *Thais lacera* (Born, 1778)
89. *Rapana rapiformis* (Born, 1778)
90. *Murex tribulus* Linnaeus, 1758
Family MELONGENIDAE
91. *Pugilina cochlidium* (Linnaeus, 1758)
Family NASSARIIDAE
92. *Nassarius foveolatus* (Dunker, 1847)
93. *N. stolatus* (Gmelin, 1791)
Family OLIVIDAE
94. *Olivancillaria gibbosa* (Born, 1778)
95. *Amalda ampla* (Gmelin, 1791)
Family TURRIDAE
96. *Turricula javana* (Linnaeus, 1767)

Famiy TEREBRIDAE

97. *Terebra tenera* Hinds, 1843

Family CANCELLARIIDAE

98. *Scalptia scalariformis* (Lamarck, 1822)

Order ENTAMOTAENIATA

Family PYRAMIDELLIDAE

99. *Odostomia oxia* Watson, 1886

Family AGLAJIDAE

100. *Melanochlamys* sp.

Order NOTAPSIDEA

Family PLEUROBRANCHIDAE

101. *Pleurobranchea* sp.

Order NUDIBRANCHIA

Family ARMINIDAE

102. *Armina* sp.

Subclass OPISTHOBRANCHIA

Order CEPHALSPIDEA

Family HAMINEIDAE

103. *Haminoea crocata* Reeve, 1860

Subclass GYMNOMORPHA

Family ONCHIDIIDAE

104. *Onchidium typhae* (Buchanan, 1800)105. *Onchidium tenerum* Stoliczka, 1869

Subclass PULMONATA

Order ARCHAEPULMONATA

Family ELLOBIIDAE

106. *Ellobium gangeticum* (Pfeiffer, 1855)107. *Cassidula nucleus* (Gmelin, 1791)108. *Pythia plicata* (Ferussac) Gray, 1825

Class BIVALVIA

Subclass PTERIOMORPHIA

Order ARCOIDA

Family ARCIDAE

109. *Anadara granosa* (Linnaeus, 1758)

110. *Scapharca deyrollei* Jousseaume, 1893

111. *S. inequalvis* (Bruguire, 1789)

Order MYTILOIDA

Family MYTILIDAE

112. *Perna viridis* (Linnaeus, 1758)

113. *Modiolus tulipa* (Lamarck, 1836)

114. *M. striatulus* Hanley, 1844

Order OSTREOIDA

Family OSTREIDAE

115. *Crassostrea gryphoides* (Schlotheim, 1813)

116. *C. cuttakensis* (Newton and Smith, 1912)

117. *Saccostrea cucullata* (Born, 1778)

Family ANOMIIDAE

118. *Enigmonia aenigmatica* Holten, 1795

119. *Anomia achaeus* Gray, 1839

Order VENEROIDA

Family SOLENIDAE

120. *Solen brevis* Gray, 1842

Family CULTELLIDAE

121. *Pharella javanicus* (Lamarck, 1818)

122. *Siliqua radiata* (Linnaeus, 1756)

123. *S. albida* Dunker, 1861

Family TELLINIDAE

124. *Strigilla splendida* (Anton, 1833)

125. *Macoma birmanica* (Philippi, 1849)

126. *Apolymetis edentula* Spengler, 1782

Family CORBICULIDAE

127. *Polymesoda bengalensis* (Lamarck, 1818)

Family VENERIDAE

128. *Meretrix meretrix* (Linnaeus, 1758)

129. *Meretrix casta* (Gmelin, 1791)

130. *Pelecypora trigona* (Reeve, 1850)

131. *Paphia textilis* (Gmelin, 1791)

132. *Timoclea* (Glycodonta) *imbricata* (Sowerby, 1853)

Family MACTRIDAE

133. *Mactra violacea* Gmelin, 1791

134. *Mactra* (*Mactrinula*) *luzonica* Deshayes, 1854

Family PSAMMOBIIDAE

135. *Sanguinolaria* (*Soletellina*) *acuminata* (Deshayes, 1857)

Family DONACIDAE

136. *Donax* (*Hecuba*) *scortum* Linnaeus, 1758

137. *Donax* (*latona*) *incarnatus* Gmelin, 1791

Family GLAUCONOMIDAE

138. *Glaucanome sculpta* Sowerby, 1894

Order MYOIDA

Family PHOLADIDAE

139. *Pholas orientalis* (Gmelin, 1791)

140. *Martesia fragilis* (Sowerby, 1873)

141. *Barnea candida* (Linnaeus, 1758)

Family TEREDINIDAE

142. *Bactronophorus thoracites* (Gould, 1856)

143. *Bankia* sp.

Subclass ANOMALODESMATA

Order PHOLADOMYOIDA

Family LATERNULIDAE

144. *Laternula truncata* (Lamarck, 1818)

VI. Phylum SIPUNCULA

Class PHASCOLOSOMATIDEA

Order PHASCOLOSOMATIFORMES

Family PHASCOLOSOMATIDAE

145. *Phascolosoma arcuatum* (Gray, 1828)

VII. Phylum ECHIURA

Class ECHIURIDA

Order ECHIUROINEA

Family THALASSEMATIDAE

146. *Anelassorhynchus microrhynchus* (Prashad, 1919)

VIII. Phylum ECHINODERMATA

Class HOLOTHUROIDEA

Order DENDROCHIROTIDA

Family CUCUMARIIDAE

147. *Thorsonia investigatoris* (Koehler & Vaney, 1908)

Order MOLPADIDA

Family CAUDINIDAE

148. *Acaudina molpadioides* (Semper, 1868)

Class ASTEROIDEA

Order PAXILLOSIDA

Family ASTROPECTINIDAE

149. *Astropecten euryacanthus* Luetken, 1872150. *A. indicus* Doederlein, 1872

Class OPHIUROIDEA

Order OPHIURIDA

Family ACTIDAE

151. *Ophiactis modesta* Brock, 1889

Class ECHINOIDEA

Order TEMNOPLEUROIDA

Family TEMNOPLEURIDAE

152. *Temnopleurus toreumaticus* (Leske, 1778)**IX. Phylum CHORDATA**

Class OSTEICHTHYES

Order ANGUILLIFORMES

Family MORINGUIDAE

153. *Moringua raitaborua* (Hamilton, 1822)

Family OPHICHTHIDAE

154. *Ophichthus altipinnis* (Kaup, 1856)155. *Ophichthus apicalis* (Bennet, 1830)

Order PERCIFORMES

Family GOBIIDAE

156. *Boleophthalmus bodderti* (Pallas, 1770)157. *Scartelaos histophorus* (Valenciennes, 1837)158. *Taneoides anguillaris* (Linnaeus, 1758)

159. *Periopthalmus novemradiatus* (Hamilton-buchanan, 1822)

Family TRYPACHENIDAE

160. *Trypauchen vagina* (Bloch & Schneider, 1801)

Class REPTILIA

Order SQUAMATA

Family NATRICIDAE

161. *Xenochrophis piscator* (Schneider, 1799)

Family HOMALOPSIDAE

162. *Cerberus rhynchops* (Schneider, 1799)

DESCRIPTION OF SPECIES

I. Phylum CNIDARIA

Class ANTHOZOA

Subclass HEXACORALLIA

Order ACTINIARIA

Suborder NYNATHEAE

Family EDWARDSIIDAE

1. *Edwardsia jonesii* Sheshaiya & Cuttress, 1969

(Plate II. A)

1969. *Edwardsia jonesii* Sheshaiya & Cuttress, *J. Mar. Biol. Ass. India*, **11**(1 & 2) : 73, Figs. 1, 2

2001. *Edwardsia jonesii* Bairagi, *Zool. Surv. of India. Fauna of Godavari Estuary*, 11-12

Material examined : 2 ex, Talsari, 03.vii.2006, A. Misra & S. Mitra; 1 ex, Kirtania, 13.x.2007, A. Misra & S. Mitra

Diagnosis : Tentacles 12, smooth and arranged in two cycles of six each, body distinctly divided into capitulum, scapulus, scapus and inflatable physa without cuticles. Capitulum thin-walled, almost transparent, smooth and without cuticle. Scapus thick-walled, covered with thick shaggy rusty-red cuticle. Actinopharynx with 8 longitudinal ridges, siphonoglyph indistinct.

Habitat : Burrowing forms in soft muddy substratum of Intertidal zonation of Talsari and Kirtania beside the narrow creeks.

Distribution : India : Subarnarekha estuary (Orissa), South 24 parganas (West Bengal) and Tamilnadu.

Remarks : This species is a common in the estuaries of east coast of India, recently it was found in Kali river estuaries of Karnataka (Mitra *et al.*, in Press).

Family HALIACTIIDAE

2. *Pelocoetes exul* Annandale, 1915

(Plate II. B)

1915. *Pelocoetes exul* Annandale, *Mem. Ind. Mus.*, 5 : 86, pl.6, fig. 1; pl. 7, figs. 3, 3a,3b; text fig. 5.

2001. *Pelocoetes exul* Bairagi, *Zool. Surv. of India. Fauna of Godavari Estuary*, 12.

Material examined : 4 ex, Talsari, 06.iv.2007, A. Misra & S. Mitra; 3 ex. , Talsari, 15.x.2007, A. Misra & S. Mitra

Diagnosis : Basal disc reduced. Bluntly tapering and without physa. Column elongated. Longitudinal rows of nematosyst batteries alternating with cinclides on column. Tentacles are branched hexamerously arranged (6 + 6+12+24+48, the last cycle more or less complete) oral disc lobed.

Habitat : Soft mud burrowing form in the Intertidal zone, found at talsari mudflat just beside the narrow creeks of the middle tidal area.

Distribution : India : Subarnarekha estuary (Orissa), South 24 parganas and Gangetic delta (West Bengal), Tamilnadu, Maharastra, Kerala and Goa.

Remarks : This species is very common in the estuaries and found in the muddy shore near the estuarine mouth.

Family DIADUMENIDAE

3. *Diadumene schilleriana* (Stoliczka, 1869)

(Plate II. C)

1869. *Sagaritta schilleriana* Stoliczka, *J. Asiat. Soc. Bengal*, 38(2) : 31, pls. 10, 11.

1915. *Metridium schillerianum* (Stoliczka): Annandale, *Mem. Ind. Mus.*, 5 : 76, pl.7 fig.1

1998. *Diadumene schilleriana* Bairagi, *Zool. Surv. of India. Fauna of West Bengal*, Part-11: 37-38, fig. 1-A, B

Material examined : 12 ex, Talsari, 06.iv.2007, A. Misra & S. Mitra; 8 ex., Talsari, 16.iii.2008, A. Misra and S. Mitra.

Diagnosis : Body divided into Scapus and Capitulum. Scapus with Cinclides and Capitulum with collar. Body very short, 12-19 mm. in length and diameter greater than that of column and provided with longitudinal rows of warts, tentacles long and numerous inner tentacles thicker than outer tentacles. Basal disc strong and adhesive. Distinct sphincter absent.

Habitat : Occuring on rocks and boulders of uppertidal shore of the mouth of Subarnarekha estuary (Duttapur–Talsari).

Distribution : India : Subarnarekha estuary (Orissa), Canning, Dimond harbour, Sagar Island (West Bengal) and Maharastra.

Remarks : This species often found on living animals like hermit Crabs, horse-shoe crab and sometimes also on plastics bags which are occasionally found as floating in waters.

Family ACTINIIDAE

4. *Paracondylactis indicus* Dave, 1957

(Plate II. D)

1968. *Paracondylactis indicus* Dave. Parulekar, *J. Bombay. nat. Hist. Soc.*, **65**(1-3) : 143

1998. *Paracondylactis indica* Bairagi, *Zool. Surv. of India. Fauna of West Bengal, Part-11* : 38-40.

Material examined : 2 ex, Talsari, 01.iv.2007 A. Misra & S. Mitra; 3 ex., Talsari, 04.iv.2007, A. Misra & S. Mitra

Diagnosis : Column elongated and tapering. Pseudosphierules present on columns. Pedal disc flattend but distinct. Tentacles 96, white in colour, arranged in 5 cycles.

Habitat : In the sandy as well as muddy area of lower littoral zone of the estuary mainly at talsari. The anemone can retreat upto a depth of 120 cm.

Distribution : India : Subarnarekha estuary (Orissa), Gangetic delta (Sagar Is. and Digha), West Bengal and Maharastra.

Remark : This species is endemic to India.

Class OCTOCORALLIA

Order PENNATULACEA

Family VERTILLIDAE

5. *Cavernularia* sp.

(Plate II. E)

Material examined : 1 ex, Talsari, 01.iv.2007, A. Misra & S. Mitra

Diagnosis : Colonies are globular, bush shaped, Bilateral symmetry throughout length of rachis axis. Polyp leaves present, relatively short, composed of tubular autozooids that are fused to adjacent autozooids for most of their length. Autozooids vary from three to over one hundred autozooids per leaf. Anthocodiae retractile into bulbous basal portions of autozooids, thus forming fleshy calyx-like structures, which are all equal in size. Colonies are bronish in colour, Showing bioluminiscence

Habitat : Sandy flats and slopes adjacent estuarine mouth. Lower and mild tidal area.

Distribution : India : Subarnarekha estuary (Orissa), Digha (West Bengal), Tamilnadu and Karnataka.

Elsewhere : Atlantic, Indian, and Pacific Oceans.

Remark : Population of this species declined in alarming rate due to anthropogenic pressure at Talsari.

Family VERGULARIDAE

6. *Virgularia* sp.

(Plate II. F)

Material examined : 6 ex., Talsari, 04.04.2007, A. Misra & S. Mitra

Diagnosis : Colonies long, slender, often vermiform, or stout to robust. Bilateral symmetry throughout length of rachis. axis extends throughout most of the length of the colony, sometimes beyond the apex of the rachis, mostly round in cross-section. Polyp leaves present, relatively short, Siphonozooids distributed mostly on the rachis between the polyp leaves. Sclerites absent or reduced to minute ovals in the interior of the peduncle.

Habitat : Mudflat with mixed sand at the lower littoral zone, adjacent to estuarine mouth.

Distribution : India : Subarnarekha estuary (Orissa), Digha (West Bengal) and Tamilnadu,

Elsewhere : Atlantic, Indian and Pacific Oceans.

II. Phylum ANNELIDA

Family POLYNOIDAE

7. *Lepidonotus tenuisetosus* (Gravier, 1901)

1901. *Euphione tenuisetosa* Gravier, *Nouv. Archs. Mus. Hist. nat.*, paris (sr. 4), **3** : 22, pl. 8, figs. 123-126. txt. figs. 228-231.

1911. *Lepidonotus tenuisetosus*, Fauvel, *Fauna of British India*, p. 36. fig. 14.

1999. *Lepidonotus tenuisetosus* Misra, *Fauna of West Bengal, State Fauna series*, **3**(Part-10) : 133.

Material examined : 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : Elytra 12 pairs, oval, slightly reniform, with a small fringe, covered with a few large and a number of smaller rounded papillae and also very small calicinate papillae on the outer edge; dorsal setae slender, nearly capillaries and spinulose; ventral setae with a rather long smooth tip and few fringes.

Habitat : Lower and sub tidal area near the estuarine mouth, here both the specimens were collected from the inner walls of molluscan shells occupied by hermit crabs.

Distribution : India: Subarnarekha estuary, Mahanadi estuary (Orissa), Lower reaches of Hooghly estuary (West Bengal), Chennai (Tamil Nadu), Andaman Islands, Vembanad lake (Kerala), Goa, Maharastra and Gujarat.

Elsewhere : Red Sea, Persian Gulf, Mosambique, Madagascar, South Africa, Mergui Island, Japan and Tropical West Africa.

Remarks : Common form, lives in associated with inner side of the shells of hermit crabs and in between the book-gills of horse-shoe crabs; hence the proper population could not be estimated

Family AMPHINOMIDAE

8. *Chloeia parva* Baird, 1870

(Plate III. A)

1870. *Chloeia parva* Baird, *J. Proc. Linn. Soc. London (Zool.)*, **10** : 233.

1999. *Chloeia parva* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 138-139.

Material examined : 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra; 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : A mid-dorsal row of dark marks in the form of roman "T"; caruncle with crest surmounted by a black wavy line extending up to setiger 6, branchiae from setiger 4; notosetae short and serrated, neurosetae long and smooth.

Habitat : Pelagic, lives in the muddy substrata in lower and sub-tidal area.

Distribution : India : Subarnarekha Estuary, Chandipur (Orissa), Mouth of Hooghly estuary (W.B.) Vishakhapattanam (Andhra Pradesh), Andamans and West coast of India.

Elsewhere : Gulf of Oman; Sri Lanka; Malay; Mergui; Sumatra; Java, New Guinea.

Remarks : One of the common Polychaete from this area. At talsari this species occasionally captured by the net operated regularly for the collection of post larvae of Tiger prawn and thus a massive loss of this species along with other polychaetes are going on this area.

9. *Chloeia rosea* Potts, 1909

1909. *Chloeia rosea* Potts, *Trans. Linn. Soc. Lond.*, (Sr. 2) **12** : 357.

1974. *Chloeia rosea* Hartman, *J. Mar. biol. Ass. India.*, **16**(2) : 612.

Material examined : 1 ex.17.iii.2008, Kirtania, A. Misra & S. Mitra.

Diagnosis : Uniformly reddish pink without any dorsal pattern; branchiae well developed and overlap the middle line.

Habitat : Pelagic, lives in the muddy substrata in lower and sub-tidal area.

Distribution : India : Subarnarekha Estuary (Orissa); Gangasagar(West Bengal) and Tamilnadu.

Elsewhere : Arabian Sea and Persian Gulf.

Remarks : This species is very rare from this area.

Family PHYLLODOCIDAE

10. *Eteone barantollae* Fauvel, 1932

(Plate III. B)

1932. *Eteone barantollae* Fauvel, *Mem. India. Mus.*, **12** : 72.

1999. *Eteone barantollae* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 140.

Material examined : 13 ex. 16.iii.2008. Talsari, A. Misra & S. Mitra; 3 ex. 06.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Yellowish white in live condition, brown in spirit; prostomium oval with 2 pairs of short antennae; tentacular cirri 2 pairs, subulate; pharynx eversible, smooth at base and with 5 longitudinal rows of ridges distally.

Habitat : Sandy part of lower and mid-littoral bank of the estuary.

Distribution : India : Subarnarekha Estuary, Baitarani estuary (Orissa), Salt Lake, mouth of Hooghly river (West Bengal) and Pulikat Lake (Tamil Nadu).

Remarks : Common, population estimated 14-28 /sq. mt. Endemic in east coast of India.

11. *Eteone (Mysta) ornata* Grube, 1878

1878. *Eteone (Mysta) ornata* Grube, *Mem. Acad. Sci. S. Peterb.*, **25** : 106.

1999. *Eteone (Mysta) ornata* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 141.

Material examined : 2 ex, 03.iv.2007, Kankrapal, A. Misra & S. Mitra.

Diagnosis : Body elongated with 3 striking longitudinal rows of violet pigment spots upon a pale yellowish colour towards the middle part of body, becomes gradually smaller and blend into a single streak, disappear completely posteriorly; proboscis with lateral rows of soft papillae and small spinous tubercles.

Habitat : Lives in crevices under stones. This species is recorded first time from Orissa Coast.

Distribution : India : Subarnarekha estuary (Orissa) and Mouth of Hooghly estuary (West Bengal).

Elsewhere : Mozambique; Philippines and North Japan Sea.

Remarks : Very rare form this estuary.

Family TALEHSAPIIDAE

12 *Talehsapia annandalei* Fauvel, 1932

1932. *Talehsapia annandalei* Fauvel, *Mem. Indian Mus.*, **12** : 251.

1999. *Talehsapia annandalei* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 144-145.

Material examined : 14 ex, 05.iv.2007, Pantei, A. Misra & S. Mitra.

Diagnosis : Body slender; prostomium small conical without eyes, antennae and palps. Tentacular cirri absent; parapodia sub-biramous; notopodia reduced with 1 or 2 smooth capillaries; neuropodia blunt, cylindrical lobe with straight capillaries with several transverse rows of spines.

Habitat : Clayey soil in the upper tidal zone.

Distribution : India : Subarnarekha Estuary, Baitarani estuary (Orissa) and Hooghly-Matla estuary (West Bengal).

Elsewhere : Thailand.

Remarks : At Pantei population estimated 25-40/sq.mt.

Family NEREIDIDAE

Subfamily NAMANEREIDINAE

13. *Namalycastis fauveli* Rao, 1981

1981. *Namalycastis fauveli* Rao, *Bull. zool. Surv. India*, 3(3) : 215.

1999. *Namalycastis fauveli* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 147-148.

Material examined : 3 ex, 03.vii.2006, Kankrapal, A. Misra & S. Mitra; 2 ex, 05.iv.2007, Pantei, A. Misra & S. Mitra.

Diagnosis : Prostomium wider than long, anterior border straight, no median groove, palps short and broad, tentacular cirri 4 pairs, short, sub-equal, hardly reaching beyond setiger 1; parapodia sub-biramous throughout; notosetae hemigomph spinigers, neurosetae of 2 kinds-heterogomph spinigers and heterogomph falcigers.

Habitat : Soft clayey soil in the zone between high tidal line and mid tidal line.

Distribution : India : Subarnarekha estuary, Baitarani River (Orissa). Upper and middle reaches of Hooghly estuary (West Bengal).

Remarks : At Kankrapal and Pantei population estimated 20-25 /sq. mt. Endemic in north-east coast of India.

14. *Namalycastis indica* (Southern, 1921)

1921. *Lycastis indica* Southern, *Mem. India. Mus.*, 5 : 578, Pl.19, fig. 2 a-j, tex fig. 2 a-d.

1999. *Namalycastis indica* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10): 148.

Material examined : 7 ex., 04.iv.2007, Talsari, A. Misra & S. Mitra; 1 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra

Diagnosis : Prostomium wider than long, a short antero-median groove, pharynx eversible, smooth. Parapodia sub-biramous throughout. Dorsal cirri slender gradually

enlarged in middle and posterior setigers. Antennae distinct, neuropodial falcigers not modified. Noto-setae 1-2, sometimes absent, neuropodium unilobed conical process.

Habitat : Soft clayey soil in the zone between high water line and mid tidal line.

Distribution : India : Subarnarekha estuary, Kespur, Chilika lake (Orissa). Hooghly estuary (West Bengal); Andhra pradesh, Tamilnadu, Gujarat and Kerala.

Elsewhere : Mosambique, South Africa, Sri Lanka, Myanmar, Celebes and Solomon Island.

Remarks : Common in this estuary. At Talsari and Kirtania population estimated 10-20/sq. mt.

Subfamily NEREIDINAE

15. *Ceratonereis burmensis* Monro, 1937

(Plate III. C)

1937. *Nereis (Ceratonereis) burmensis* Monro, *Ann. Mag. Nat. Hist. London*, Sr. 10, 19 : 532. Fig. 1.

1999. *Ceratonereis burmensis* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 149.

Material examined : 13 ex., 13.x.2008, Kiratania, A. Misra & S. Mitra; 8 ex, 17.iii.2008, Kirtania, A. Misra & S. Mitra

Diagnosis : Pharynx eversible with paragnaths on the maxillary ring only. Tentacular cirri 4 pairs, parapodia biramous. Prostomium not incised, with small palpostyles and 4 small black eyes; notoseate spinigers only, and neuroseate spinigers and falcigers confirmed to a short mid-body region.

Habitat : Clayey or sandy soil towards low water zone.

Distribution : India : Subarnarekha Estuary (Orissa), Sundarbans (West Bengal) and Off Bombay (Maharashtra).

Elsewhere : Myanmar.

Remarks : One of the very common polychaete from this estuary. At Kirtania population estimated 70-110 /sq. mt. This species is recorded first time from Orissa Coast.

16. *Dendronereides gangetica* Misra, 1998

1999. *Dendronereides gangetica* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 150-151, fig. 4 A-E, 5 A-d, 6 A-M.

Material examined : 1 ex, 16.iii.2008, Talsari, A. Misra & S. Mitra.

Diagnosis : Prostomium deeply indented anteriorly with two short tapered antennae; tentacular cirri 4 pairs; branchiae commencing from setiger 10 and extending up to 38, first in the form of simple filaments, then gradually forming a whorl involving 2 superior notopodial ligules; notosetae homogomph spinigers with long and short blades, neurosetae of 3 kinds, homo and hemigomph spinigers and homogomph falcigers.

Habitat : Soft mud in the low tidal zone.

Distribution : India: Subarnarekha Estuary (Orissa), Hooghly estuary, Champa River (West Bengal).

Remarks : Endemic to the east coast of India. It is the first record of this species from coast of Orissa, very rare from this estuary.

17. *Dendronereides heteropoda* Southern, 1921

(Plate III. E)

1921. *Dendronereides heteropoda* Southern, *Mem. Indian Mus.*, **5** : 603.

1999. *Dendronereides heteropoda* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 152.

Material examined : 7 ex, 12.x.2007, Talsari, A. Misra & S. Mitra; 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Prostomium broad, slightly indented in front ; branchiae in the form of branched bunches of filaments arising below dorsal cirrus, commencing from setiger 7 or 8 extending up to the setiger 25-35 ; notosetae homogomph spinigers, neurosetae of 4 kinds homo and heterogomph spinigers and homo and heterogomph falcigers.

Habitat : Burrows in soft silty mud from mid-tidal level to low water line.

Distribution : India : Subarnarekha Estuary, Burhabalang estuary, Chandipur, (Orissa); Tarapur, Bombay (Maharashtra); Vellarpadan (Kerala) and Hooghly estuary, Champa river (West Bengal).

Remarks : Most common Polychaetes in this estuary, at Talsari there population estimated 150-200/sq. mt.

18. *Dendronereis aestuarina* Southern, 1921

(Plate III. D)

1921. *Dendronereis aestuarina* Southern, *Mem. Indian. Mus.*, **12** : 598, Pl. 20, fig. 4

1999. *Dendronereides heteropoda* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 153.

Material examined : 3 ex. 15.x.2007, Talsari, A. Misra & S. Mitra; 1 ex. 16.iii.2008, Talsari, A. Misra & S. Mitra

Diagnosis : Anterior 10-12 segments light green with brown pigments, posteriorly light coloured. Pharynx eversible with a pair of jaws, maxillary ring smooth, oral ring with soft papillae. Parapodia biramous from 3rd setiger with 3 notopodial ligules. Branchiae as bipinnate division of dorsal cirri, commencing from setiger 15 and extended upto 21-22. Setae all homogomph spinigers.

Habitat : Soft black mud near the mid-tidal zone, particularly abundant in sewage outfall areas.

Distribution : India : Subarnarekha Estuary, Baitarani River (Orissa). Lower reaches of Hooghly estuary, Champa River (West Bengal).

Remarks : Endemic in north-east coast of India, at Talsari there population estimated 160-190 /sq. mt.

19. *Lycastonereis indica* Rao, 1981

1981. *Lycastonereis indica* Rao, *Bull. zool. Surv. India*, 3(3) : 213.

1999. *Lycastonereis indica* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 159 : figs. 11 A-F, 12 A-E.

Material examined : 2 ex., 13.X.2007, Kiratania, A. Misra & S. Mitra

Diagnosis : Prostomium with dark brown spots forming a definite pattern, extending in 3 rows up to setiger 24/26, a pair of short antennae; tentacular cirri 3 pairs; notosetae homogomph spiniger with minute serrations, neurosetae of 3 kinds, homo and hemigomph spinigers and heterogomph falcigers.

Habitat : Soft black mud near the mid-tidal zone, particularly abundant in sewage outfall areas.

Distribution : India : Subarnarekha estuary, Baitarani River (Orissa); lower reaches of Hooghly estuary, Champa River (West Bengal).

Remarks : Very rare in this estuary, at Kiratania population estimated 2-3/sq.mt. Endemic in north-east coast of India

20. *Perinereis cultrifera* (Grube, 1840)

(Plate IV. A)

1840. *Nereis cultrifera* Grube, *Actinien Echinodermen und wurmen Description Adriatischenundmittelmeeres*, p. 74.

1999. *Perinereis cultrifera* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 164.

Material examined : 4 ex.19.iii.2008, Talsari, A. Misra & S. Mitra; 1 ex. 07.vii.2006, Kirtania, A. Misra & S. Mitra

Diagnosis : Prostomium sub-pyriform with dark longitudinal bands of pigments between anterior pair of eyes; paragnaths arranged as follows: I = 2 cones in vertical line; II = 10-12 cones in curved rows, III = 12-16 cones in oval patch; IV = 20-25 cones about three oblique rows forming a wedge, V = 3 cones in triangle, VI = a single transverse bar on each side, VII-VIII = 2-3 continuous transverse rows of cones reducing to single row at both sides; notosetae homogomph spinigers only, neurosetae homo and heterogomph spinigers and heterogomph falcigers.

Habitat : Soft mud at lower littoral zone.

Distribution : India : Subarnarekha estuary, Mahanadi estuary, Gopalpur (Orissa); Hooghly estuary (West Bengal); Gulf of Mannar; Andamans and Maharashtra.

Elsewhere : Philippines, Mergui Island, Australia, New Zealand, Costarica.

Remarks : At Kiratania and Talsari population estimated 10-12/sq. mt.

Family GLYCERIDAE

21. *Glycera convoluta* Keferstein, 1862

(Plate IV. E)

1862. *Glycera convoluta* Keferstein, *Z. Wiss. zool.*, **12** : 106.

1999. *Glycera convoluta* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 168, fig. a-h.

Material examined : 7 ex. 13.X.2007, Kirtania, A. Misra & S. Mitra; 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : Prostomium with 10–12 rings, 2 small eyes, and 4 small tentacles distally; branchiae simple appear as short stumpy lobes above the dorsal edge of setiger 35 to 40; notosetae capillaries, neurosetae composite homogomph spinigers.

Habitat : Silty mud in the zone between mid tidal level and low tidal level.

Distribution : India : Subarnarekha estuary, Ganjam coast, Puri, Konarak (Orissa) Lower reaches of Hooghly estuary (W.B.); Cochin backwater (Kerala); Ghogha (Gujarat), Coast of Maharashtra and Marmagaon Bay (Goa).

Elsewhere : South Africa, Mosambique, Persian Gulf, Japan and South America.

Remarks : At Kiratania and Talsari population estimated 80-130/sq. mt.

22. *Glycera rouxii* Audouin & Milne Edwards, 1833

1833. *Glycera rouxii* Audouin & Milne Edwards, *Annl. Sci. nat.*, **29** : 264.

1999. *Glycera rouxii* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 170.

Material examined : 9 ex. 06.iv.2007, Talsari., A. Misra & S. Mitra; 3 ex., 14.x.2007, Kankrapal, A. Misra & S. Mitra

Diagnosis : Pharygeal papillae in the form of smooth conical globular processes; branchiae simple slender, retractile and start from the anterior surface of setiger 22-24; pre-setal ligules sub-equal and short, post-setal lobe rounded

Habitat : Soft silty sediments near or below low water level.

Distribution : India : Subarnarekha estuary, Chandipur (Orissa); Hooghly estuary (lower reaches), Canning (W.B.); Vishakhapatnam (A.P.), Vellar estuary, Gulf of Maanar, Pamban backwater (Tamil Nadu); Andamans; Kerala Coast and Lakshadweep.

Elsewhere : Madagascar, Mosambique, Persian Gulf, Japan, Mediterranean sea and North Atlantic.

Remarks : At Kankrapal and Talsari population estimated 20-30/sq. mt.

23. *Glycera tessellata* Grube, 1863

1863. *Glycera tessellata* Grube, *Arch. Naturgesch.*, **29** : 41.

1999. *Glycera tessellata* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 170

Material examined : 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : Pharyngeal papillae uniform, very long and grooved without rings ; pre-setal ligule sub-equal and 2 shorter rounded sub-equal post setal lobes ; branchiae absent.

Habitat : Soft silty sediment of the lower littoral zone.

Distribution : India : Subarnarekha estuary, Chandipur, Gopalpur, Puri (Orissa); Godavari estuary (A.P.); Andamans; Nani Daman (Daman) and Sundarbans (W.B.).

Elsewhere : Madagascar, Mosambique, Persian Gulf, Japan, Red Sea, Mediterranean sea, British Columbia, West Indies and Maldives.

Remarks : At Talsari population estimated 2-5/sq. mt.

24. *Glycera longipinnis* Grube, 1878

1878. *Glycera longipinnis* Grube, *Acad. Sci. S. Peterb.*, **25** : 182.

1999. *Glycera longipinnis* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 169-170.

Material examined : 12 ex. 12.x.2007. Talsari, A. Misra & S. Mitra; 2 ex., 05.iv.2007, Pantei, A. Misra & S. Mitra

Diagnosis : Pharyngeal papillae of two kinds; parapodia biramous with 2 subequal, cirriform presetal ligules, and a single postsetal lobe ; branchial filaments simple, longer than presetal ligules, commencing from the dorsal surface of setiger 20-22.

Habitat : Silty mud towards the low water zone.

Distribution : India : Subarnarekha estuary, (Orissa); Hooghly estuary (W.B.)

Elsewhere : Indo-west Pacific.

Remarks : At Pantei and Talsari population estimated 10-12/sq. mt. It is the first report of this species from the Orissa coast.

Family ONUPHIDAE

25. *Diopatra cuprea* (Bosc, 1802)

(Plate IV. C)

1802. *Nereis cuprea* Bosc, *Histoire Naturelle..... Nature*. Paris, **1** : 143.

1999. *Diopatra cuprea* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 173

Material examined : 1 ex. 03.iv.2007, Kankrapal, A. Misra & S. Mitra; 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra.; also observed in Kiratania and Udaypur.

Diagnosis : Prostomium with a pair of short, subulate frontal antennae, a pair of oval cushion-like palps, and five occipital antennae; tentacular cirri present; branchiae commencing from setiger 4 to 5, extending up to setiger 50-61, branchial filaments arranged in 10-12 whorls ; setae include limbate seate, pseudocomposite hooks, pectinate setae and sub-acicular hooks.

Habitat : Lives in tough tubes made of fine sands projected part decorated with shell fragments, leaves, embedded in stiff mud.

Distribution : India : Subarnarekha estuary, Chandipur (Orissa); Matla river (West Bengal); Ratnagiri (Maharashtra).

Elsewhere : Mosambique, South Africa, Sri Lanka, U.S.A., Gulf of Mexico and Brazil.

Remarks : At talsari population estimated 80-120 /sq.mt.on the mud flat beside the narrow creeks, where as on the lower tidal sandy beach area its population is not so good, only 20-30/sq. mt.

26. *Onuphis eremita* Audouin & Milne Edwards, 1833

1833. *Onuphis eremita* Audouin & Milne Edwards, *Ann. Sci. Nat.*, **129** : 1226.

2005. *Onuphis eremita* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) :173

Material examined : 2 ex. 01.iv.2007, Talsari., A. Misra & S. Mitra; 3 ex. 06.vii.2006, Talsari, A. Misra & S. Mitra.

Diagnosis : Median occipital antennae shorter than the inner laterals; tentacular cirri inserted dorso-laterally and longer than the peristomial segments; branchiae from the first setiger with simple filaments, with 2 filaments from 22-24 setigers, reaching maximum with 4-5 filaments and then decrease posteriorly; setae include anterior hooded pseudocomposite hooks, posterior winged capillaries, pectinate setae and bidentate acicular setae with guard.

Habitat : Lives in thin tubes encrusted with sand towards the low water zone.

Distribution : India : Subarnarekha Estuary (Orissa) Digha Coast (West Bengal); Andhra Pradesh and Chennai.

Elsewhere : Sri Lanka; Madagascar, Indo-China and Suez Canal, Atlantic ocean.

Remarks : At talsari population estimated 10-15/sq. mt.

Family LUMBRINERIDAE

27. *Lumbrineris notocirrata* Fauvel (1932)

(Plate IV. B)

1932. *Lumbrconeris notocirrata* Fauvel, *Mem. Indian. Mus.*, **12** : 156.

1999. *Lumbrconeris notocirrata* Misra, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 181.

Material examined : 5 ex. 06.iv.2007, Talsari, A. Misra & S. Mitra; 3 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra.

Diagnosis : Prostomium bluntly conical without eyes and antenna ; parapodia biramous with dorsal cirri reduced to small knobs in anterior feet, and long and strap-like in middle and posterior ends ; Capillaries in all feet and simple hooded hooks from setiger 40-45.

Habitat : Sandy silty area at mid-littoral zone.

Distribution : India : Chandipur, Subarnarekha Estuary (Orissa coast), Hooghly estuary, Sudarbans (West Bengal) and Vishakhapatna backwater (Andhra Pradesh).

Remarks : Endemic in east coast of India. At Udaypur and Talsari population estimated only 5-8/sq. mt.

28. *Lumbrineris heteropoda* (Marenzeller, 1879)

1879. *Lumbriconereis heteropoda* Marenzellar, *Izuka*, p. 30. pl. VI; fig. 1

1999. *Lumbrinereis heteropoda* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 180

Material examined : 14 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra

Diagnosis : Prostomium bluntly conical without eyes and antenna ; parapodia biramous with dorsal cirri reduced to small knobs in anterior feet, and long and strap-like in middle and posterior ends ; Capillaries in all feet and long bladed simple hooded hooks on setiger 20-40.

Habitat : Sandy mud at mid-littoral zone.

Distribution : India : Subarnarekha Estuary, Chandipur (Orissa). Hooghly estuary, Sudarbans (West Bengal); Godavari estuary (A.P.) and Cochin estuary (Kerala).

Elsewhere : Japan, Indo-China, Persian Gulf and Red sea.

Remarks : At Kirtania there population estimated 70-120/sq. mt. This species recorded first time from Orissa coast.

29. *Lumbrineris polydesma* (Southern, 1921)

(Plate IV. D)

1921. *Lumbriconereis polydesma* Southern, *Mem. Indian. Mus.*, 5 : 622.

2005. *Lumbrineris polydesma* Misra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part 5) : 268

Material examined : 7 ex. 07.vii.2006, Kirtania, A. Misra & S. Mitra ; 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Prostomium bluntly conical without eyes and any other appendages; parapodia uniramous, postsetal lobe short, narrow, conical and longer than presetal lobes in posterior setigers; setae of 2 kinds, limbate and simple hooks. Hooks appear on setiger 30-35.

Habitat : Soft sandy-mud towards lower and middle tidal zone.

Distribution : India : Subarnarekha Estuary, Chandipur, Talichua, Chilka Lake (Orissa); Vellar Estuary, Adyar Estuary, Pulikat lake (Tamil Nadu); Nani Daman, Davka (Daman); Hooghly estuary (West Bengal) and Krishna estuary (A.P.).

Remarks : This is Endemic to India; at Kiratania and talsari population estimated 30-50/sq.mt.

Family MALDANIDAE

30. *Euclymene annandalei* Southern, 1921

(Plate III. F)

1921. *Euclymene annandalei* Southern, *Mem. Indian. Mus.*, 5 : 648.

1974. *Euclymene annandalei* Hartman, *J. Mar. biol. Ass. India.*, 16(2) : 629

Material examined : 12 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra; 7 ex. 06.vii.2006, Udaypur, A. Misra & S. Mitra

Diagnosis : Body cylindrical with long segments, 21 setigers; Prostomium bluntly triangular with numerous ocelli; cephalic rim crenulate posteriorly; a dorsal glandular streak from setiger 9; notosetae mainly with narrow winged capillaries anteriorly, include feathered forms posteriorly; setigers 1-3 with a single acicular spine with a smooth bent teeth; neurosetae with numerous hooks each with a vertical series of 5-6 teeth above the main fang.

Habitat : Lives in burrows in open sandy bed forming fragile tubes.

Distribution : India : Subarnarekha Estuary, Chilka Lake (Orissa); Hooghly estuary, Digha Coast (West Bengal); Camorta and Nicobar Island, Andaman Sea.

Remarks : At talsari population estimated 140/sq.mt. in the soft mud mixed with coarse sand beside the tidal creeks, but in Kiratania population is very poor, only 2-5/sq. mt.

Family TERESELLIDAE

31. *Loimia medusa* (Savigny, 1818)

(Plate IV. F)

1818. *Terebella medusa* Savigny, *Histoire naturelle description animaxces Sans Vertebres* : 95.

1984. *Loimia medusa* Hutchings & Murray, *Rec. Aust. Mus.*, 36(suppl. 3) : 97.

1999. *Loimia medusa* Misra, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 198-199.

Material examined : 2 ex. 06.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Tentacular lobe short with several eye-spots; lateral lobe membranous, horizontally placed over segment 2 and 3; branchiae 3 pairs, first often longer than other two; 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.

Habitat : Live in tubes made up of sand grains.

Distribution : Subarnarekha Estuary, Hooghly estuary, Gulf of Mannar, Gujarat coast, Lakshadweep, Andaman Islands.

Elsewhere : Mosambique, Australia, Red Sea, Indo-China, Japan, South Carolina, California, West Indies and English Channel.

Remarks : At Talsari their population is about 5-8/sq. mt., it's generally prefer coarse sandy area beside the narrow creeks.

Class OLIGOCHAETA

Order HAPLOTAXIDA

Family ACANTHODRILIDAE

32. *Pontodrilus littoralis* (Grube, 1857)

1857. *Pontodrilus littoralis* Grube, *Vidensk Meddel. Fra. D. Naturhist. Foren. Kobenhavn*, pt. 11 : 164.

1881. *Pontodrilus bermudensis* Beddard, *Ann. Mag. Nat. Hist.*, (ser. 6), 7 : 96.

1999. *Pontodrilus littoralis* Halder, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 32-33.

Material examined : 17 ex. 14.x.2007, Kirtania, A. Misra & S. Mitra

Diagnosis : Length 32 to 120 mm, diameter 2 to 4 mm, 75 to 125 segments, prostomium epilobic, tongue open, dorsal pores absent, clitellum saddle shaped, 13-17, setae ornamented ectally, male and prostatic pores minute on 18, spermathecal pores 2 pairs in 7/8/9, genital markings transversely oval, unpaired median, usually in 19/20, occasionally in 12/13, 13/14.

Habitat : In river side sandy mud (upper littoral zone), near Jetty, Coarse sand with organic matter where salinity was very low.

Distribution : Widely distributed in coastal region and estuaries of India.

Elsewhere : Africa, Malayasia, Sri Lanka, Maldives, Myanmar, Indonesia, Hawii, West Indies, U.S.A. and South America.

Remarks : At Kirtania population is about 25-40/ sq. mt, its generally found here in the mud mixed sandy area beside the jetty on the upper tidal area.

III. Phylum BRACHIOPDA

Class LINGULATA

Family LINGULIDAE

33. *Lingula anatina* Lamarck, 1801

(Plate V. A-D)

1801. *Lingula anatina* Lamarck, *Système des Muséum National d'Histoire Naturelle l'an 8 de la République.*- Déterville, Paris, 432 p., Pls. 1-6 : 140-141.

1989. *Lingula anatina* Mandal & Nandi, Fauna of Sunderban Mangrove Ecosystem, West Bengal, India, 15.

Material examined : 16 ex; Talsari, Date: 05. vi. 2006; A. Misra and S. Mitra, 13 ex., Kirtania, Date: 13. X. 2007, A. Misra and S. Mitra; 11 ex; Talsari, Date : 19.iii. 2008; Coll : A. Misra and S. Mitra.

Diagnosis : Shells shape oblong; sub parallel lateral margins; anterior margin slightly convex to straight with a median projection; smooth external valve surface but distinct growth lines. Colour greenish (from translucent green to dark green), sometimes slightly brownish along the lateral and posterior margins. Deltidial regions acute: dorsal valve with triangular beak with straight to slightly concave profile; ventral valve with a pedicle groove without visible growth lines, discontinuous with the internal side of the valve. The general muscle disposition is elongate. On the ventral face, the left perimial line is strongly curved below the median internal oblique muscle, anterior internal oblique muscles (near the anterior oblique muscle) and posterior internal oblique muscles are well separated.

Distribution : India : East coast : Subarnarekha Estuary (Orissa); Kankinda Bay and Krishna Estuary (Andhra Pradesh); Parangipettai Beach (TamilNadu); Sunderban (West Bengal); West Coast : Karwar (Karnataka) Konkan Coast (Maharashtra); Beyt Island, Okha (Gujarat); Mayabandar, Phoenix Bay and Port Blair (Andaman Islands).

Elsewhere : Australia, Japan, China, Philippines.

Habitat : In Subarnarekha estuary, the habitat of *Lingula anatina* occurs in either side of the tidal creeks, substrata are generally soft muddy area, but sometimes black soil (decomposed) and sand mixed mud were preferred for living. Juvenile's bed was found in fine soft mud only. The Lingulids beds are only 2-8 mts in width. Both the banks of the creeks covered by patchy mangroves and mudflats highly exposed during low tide, the area is inundated by sea water at a depth of 0.5 to 1.2 mts during high tide.

Remarks : The occurrences of the Lingulids were predominant in the scanty zones of mangrove forest of the Subarnarekha estuary. Due to presence of suitable habitat and lack of disturbance in this estuary a vast belt of 19 km long and several meters width of Lingulids habitat is no-where reported in our country. The mean population were measured 640-720/m² on the soft mud just beside the narrow creeks and 900-1200/m², at a distance of 4-8/ m² from the creek and on silty sand. Juveniles are found in pre and post monsoon with a population of 2300-2700/ m². Juvenile beds are found only in the sticky mud.

IV. Phylum ARTHROPODA

Class CRUSTACEA

Subclass CIRRIPIEDIA

Order THORACICA

Family BALANIDAE

34. *Balanus amphitrite* Darwin, 1854 (Plate VI. B)

1854. *Balanus amphitrite* Darwin, C.A. Monograph on the Sub-class Cirripedia. *Tr. Zoological Society Of London*, **22** : 133-137.

1989. *Balanus amphitrite* Mandal & Nandi, Fauna of Sunderban Mangrove Ecosystem, West Bengal, India, 23.

Material examined : 12 ex, Talsari Jetty; 13.X.2007, A. Misra & S. Mitra

Diagnosis : This species is distinguished from other members of this group, by having 12-13 teeth on the labrum and a short spur on the terga that is located more than half of its length from the basi-scutal angle. The labrum is a lip-like extension anterior to the mouth, and the terga are one of two pair of plates surrounding the mouth of the barnacle along with another pair called the scuta. Also, a shell with vertical purple stripes recognizes this biofouling barnacle.

Habitat : Boulders and rocks beside the bank of river and mouth of the estuary. Prefer uppertidal area.

Distribution : Worldwide distribution in warm and temperate seas.

Remarks : It's a fouling organism, found in the jetties and on the boats and trawls.

35. *Balanus* sp.

Material examined : 12 ex, Talsari Jetty; 13.X.2007, A. Misra & S. Mitra

Diagnosis : This is some median size barnacles, having 14 teeth on the labrum and a spur on the terga that is located half of its length from the basi-scutal angle. The labrum is a lip-like extension anterior to the mouth, and the terga are one of two pair of plates surrounding the mouth of the barnacle along with another pair called the scuta.

Habitat : Boulders and rocks beside the bank of river.

Distribution : Worldwide distribution in warm and temperate seas.

Remarks : It's a fouling organism, found in the jetties and on the boats and trawls.

Family CHTHAMALIDAE

36. *Chthamalus stellatus* (Poli, 1791) (Plate VI. A)

1791. *Chthamalus stellatus* Poli, G.S. *Testacea Utriusque Siciliae eorumque historia et anatome tabulis aeneis 49 illustrata*, Parma I-III : 231.

1971. *Chthamalus stellatus* Fishelson, L., Ecology and distribution of the benthic fauna in the shallow waters of the Red Sea. *Mar. Biol., Berl.*, **10**(2) : 113-133.
1989. *Chthamalus stellatus* Mandal & Nandi, Fauna of Sunderban Mangrove Ecosystem, West Bengal, India, 23.

Material examined : Not collected, recorded from literature.

Diagnosis : It has an oval operculum and a scarious base, which sticks to the substratum. The shell is made up of six limestone plates of similar dimension; the upper opening (*operculum*) can close in order to protect the animal in case of long periods out of the water and of increase in the salinity. The shell diameter may be up to 14 millimeters wide, but its dimension depends on the habitat, on the quantity of available food and on the tide level. The tissue inside the operculum is light blue with brown and orange spots.

Habitat : Boulders and rocks beside the bank of river.

Distribution : India : East and West coast of India, Andaman and Nicobar Islands; Laccadives.

Elsewhere : Malay Archipelago, Mediterranean Sea, East and West coast of Africa, Maldives and Suez.

Remarks : It is the most common Chthamalid of the Indian coast. It's a fouling organism, found in the jetties and on the boats and trawls.

Subclass MALACOSTRACA

Order DECAPODA

Infraorder ANOMURA

Family DIOGENIDAE

37. *Diogenes affinis* Henderson, 1893

(Plate VI. C)

1893. *Diogenes affinis* Henderson, *Ir., Lunn. Soc. Zool.*; (2) **5** : 415, p. 39.
1972. *Diogenes custos* var. *affinis*: Sarojini and Nagabhushanam, *Rec. zool. Surv. India*, **66**(1-4) : 259-261.
1995. *Diogenes affinis* Reddy, *Hugli Matla Estuary, Estuarine Ecosystem Sereis*, Part-2 : 207-208.

Material examined : 5 ex; Talsari, 06.iv. 2007, A. Misra & S. Mitra

Diagnosis : Rostrum shorter, but slightly longer than ophthalmic scales. Antennular peduncle shorter than the antennal peduncle. Antennal acicle indistinctly bifurcate and the outer prong does not reach the base of the terminal joint of the peduncle. Antennal flagellum thickly setose. In the left cheliped, the palm is broader than long. Cheliped and other legs are pinkish in colour. In formalin preserved specimens the above coluration has faded.

Habitat : Lower littoral and subtidal area of sandy zone of the estuary mouth.

Distribution : India Subarnarekha estuary (Orissa); Sandheads, off the mouth of River Hugli and Digha (West Bengal); and Chennai (Tamilnadu).

Elsewhere : Burmese coast and Madagascar (E. Africa).

38. *Diogenes Planimanus* Henderson, 1893

1893. *Diogenes planimanus* Hederson, *Tr. Linn. Soc. Zool.*, 5(2) : 416, Pl.39.

1995. *Diogenes planimanus* Reddy, *Hugli Matla Estuary, Estuarine Ecosystem Sereis*, Part-2 : 208.

Material examined : 12 exes, Udaypur (sandy beach), 04.vii.2006, A. Misra & S. Mitra

Diagnosis : Rostrum short, slender and slightly exceeding the ophthalmic scales. The palm of left cheliped as long as broad, lower portion of its outer surface flattened which is bounded posteriorly by a short ridge running parallel with the carpal articulation. Carapace, cheliped and other legs are pinkish in colour. In formalin preserved specimen's the above colouration have faded.

Habitat : Lower littoral and subtidal area of sandy zone of the estuary mouth.

Distribution : India : Sandheads - off the mouth of River Hugli and Digha (West Bengal); Orissa coast, Subarnarekha estuary; Waltair (A.P.); Chennai and Rameswaram (Tamilnadu).

Elsewhere : Australia and Africa.

Remarks : This is the only marine hermit crab of Porto Novo which occurred in the Intertidal area of the open beach. This species was found to occupy the shells of 11 species of gastropods.

39. *Clibanarius infraspinatus* Hilgendorf, 1869

1869. *Clibanarius infraspinatus* Hilgendorf, *V.D. Deckens Reisen Ost. Afr.*, 3(1) : 97

1995. *Clibanarius infraspinatus* Reddy, *Hugli Matla Estuary, Estuarine Ecosystem Sereis*, Part-2 : 202-203.

Material examined : 4 ex, 01.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Eystalks shorter than the antennular peduncles, antennal peduncles. Chelipeds equal merus with a strong tooth at the proximal end of the lower inner border, distal upper margin serrated; carpus with three strong spines in a row on upper inner margin and with a few scattered spines on the rest of the upper surface. Second and third pair of legs with dactylus longer than propodus. Outer surface of propodus of third left leg flatter than in *Clibanarius clibanarius*. When alive the carapace is yellowish green. The distal ends of cheliped and other legs are yellow in colour. The eystalks are almost entirely covered by brown stripes. In formalin preserved specimens the carapace is brownish pink and cheliped, pereopods, eystalk

and antennal oscicle are reddish brown. Yellow stripes on second and third legs appeared.

Habitat : Lower littoral to mid littoral zone.

Distribution : India : Subarnarekha estuary (Orissa), The mouth of River Hugli, Junput and Digha (West Bengal); Waltair (Andhra Pradesh); Chennai, Vellar estuary, Porto Novo, Gulf of Mannar (Tamil Nadu)

Elsewhere : Red sea, Arabian Sea, Singapore, Philippines, Sydney and Taiwan.

Remarks : This fairly big sized estuarine hermit crab is found in sandy substrates in the marine zone of Subarnarekha estuary and the Vellar estuary also. This species was found to occupy the shells of 15 species of gastropods. While the other estuarine forms occur very commonly in the intertidal area, this species could be collected only during certain seasons of the year.

40. *Clibanarius Padavensis* De Man, 1888

(Plate VI. D)

1888. *Clibanarius padavensis* De Man, *J. Linn. Soc. (Zool.)*, **22** : 1887-1888 : 242, pl. 16, fig. 1

1995. *Clibanarius padavensis* Reddy, *Hugli Matla Estuary, Estuarine Ecosystem Sereis*, Part-**2** : 203.

Material examined : 2 ex, 06.iv.2007, Talsari, A. Misra & S. Mitra; 1 ex, 17.iii.2008, Kirtania, A. Misra & S. Mitra

Diagnosis : Eystalks as long as the antennular peduncles but about one-sixth longer than the anterior border of the carapace. Chelipeds equal size and similar; merus with 1 or 2 spinules at the distal end of the outer lower border; carpus with a distinct spine at the distal end of the dorsal inner border. In live condition the carapace and are green in colour. Three red lines, one on the dorsal side and two on the lateral sides are present on eystalks. On the merus and carpus walking legs brownish dark spots are seen. Formalin preserved specimens are yellowish with the chelipeds and other legs red in colour.

Habitat : Littoral zone of the estuary mouth.

Distribution : India: mouth of Hugli River, Sundarbans, Junput and Digha (West Bengal); Chilka Lagoon Subarnarekha estuary (Orissa), Chennai and Vellar estuary – Porto Novo (Tamil Nadu) and Andamans.

Elsewhere : South-East coast of Africa; Singapore and Hong-Kong.

Remarks : This is the most abundant hermit crab in muddy areas of Subarnarekha estuary, found to occupy the shells of several species of gastropods but was seen to occupy very commonly the shells of *Cerethidea cingulata*.

41. *Clibanarius clibanarius* (Herbst, 1791)

(Plate VI. F)

1791. *Cancer clibanarius* Herbst, *Krabben* (2) (I) : 20, pl. 23. fig. 1.1905. *Clibanarius clibanarius* : Alcock, *Cat. Indian Decapod Crust*, pt. 2(1), 43. pl. 4. fig. 11995. *Clibanarius clibanarius* : Reddy, *Hugli Matla Estuary, Estuarine Ecosystem Sereis, Part-2* : 201.**Material examined** : 2 ex, 07.vii.2006, Kirtania, A. Misra & S. Mitra; 3 ex, 12.x.2007, Talsari, A. Misra & S. Mitra,**Diagnosis** : Eyestalks shorter than the antennular peduncles. Chelipeds equal, similar and their fingers opening and closing horizontally, the carpus and chela have the inner border serrulated and the outer surfaces including fingers with tubercles; the merus has the upper and inner border serrulated and the outer surfaces including fingers with tubercles; the merus has the upper and inner borders serrulate with tubercles on its outer surface. Second and third pairs of legs with dactylus longer than propodus by one-third of half. In live specimens, the carapace and legs are red in colour. Eyestalk has black stripes. Yellow longitudinal stripes are present on the walking legs. Formalin preserved specimens appear yellow or orange.**Habitat** : Lower littoral and subtidal area of sandy zone of the estuary mouth.**Distribution** : India : Subarnarekha estuary (Orissa), Sandheads, Junput (West Bengal), Kakinada (Andhra Pradesh); Chennai, Porto Novo (Tamil Nadu)**Elsewhere** : West and South East coast of Africa, bay of Bengal, Singapore, Borneo and Hong Kong.**Remarks** : Occupy the same habitat with the previous species.

Family COENOBITIDAE Dana, 1826.

42. *Coenobita cavipes* Stimpson, 1859

(Plate VI. E)

1859. *Coenobita cavipes* Stimpson, *Proc. Acad. Nat. Sci. Phila.*, 245.1905. *Coenobita cavipes* Alcock, *Cat. Ind. Decapod. Crust. Pl.* 2(1), 146. Pt. 141995. *Coenobita cavipes*: Reddy, *Hugli Matla Estuary, Estuarine Ecosystem Sereis, Part-2* : 211.**Material examined** : 3 ex, 15.x.2007, Talsari, A. Misra & S. Mitra**Diagnosis** : Eye stalks compressed, dorsally punctuate, reaching the base of the terminal joint of the antennular peduncle and nearly to the middle of the last joint of the antennal peduncle. Ophthalmic scales narrow and acute. Antennal acicle fused with the second joint of the peduncle. Chelipeds and legs relatively smooth. A thick brush of long hairs on the upper part of the inner surface of both palms. In the 3rd left leg, the outer surface of the propodus nearly flat and not separated from the anterior

surface by a crest, the dactylus some shat compressed and its outer surface flat; the bigger specimens are violet in colour and small forms reddish. small sized animals are red coloured. Formalin preserved specimens are yellow in colour.

Habitat : It's a terrestrial form, found on the littoral and supra littoral area of the Subarnarekha estuary, Its often climbs the mangroves during the high tide.

Distribution : India : Subarnarekha estuary, chilka lagoon (Orissa); Southern part of sundarabans. Digha (West Binal); Chennai, Porto Novo (Tamilnadu) and Andaman and Nicobar Islands.

Elsewhere : East coast of Africa, Red Sea, Indo-pacific to West Coast of America.

Remarks : This fairly large nocturnal land hermit crab found common in this estuary. They were found to occupy the shells of three gastropods species. The bigger crabs usually found to have outgrown their domicile shells.

Infra order BRACHYURA

Family OCYPODIDAE

Sub Family OCYPODINAE

43. *Ocypode macrocera* H. Milne Edwards, 1837

(Plate VII. A & D)

1837. *Ocypoda macrocera* H. Milne Edwards, *Hist. Nat. Crust.*, II : 49

2005. *Ocypoda macrocera* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 502-503.

Material examined : 4 ex, 06.vii.2006, Udaypur, A. Misra & S. Mitra; 3 ex. 01.iv. 07, Talsari, A. Misra & S. Mitra

Diagnosis : Average Size : W = 47.0 mm, F = 11.0 mm, L = 39.00 mm; Carapace square, deep, strongly convex from before backwards and moderately so from side to side. Surface covered uniformly with small granules, chelipeds markedly unequal. The length of stridulating ridge more than half of the breadth of larger palm, this ridge consists of striae only, hairs less. Finger of the smaller cheliped broad, thin, tips also broad and blunt.

Habitat : This crab has been found in sandy areas of littoral zone. They make borrows in sandy flats and muddy sand areas between the high water spring tide and high water neep tide. Borrows of adult crabs are nearly circular of the top. Burrows are usually deep having a depth of about 1 to 1.5 m. from the surface. Borrows of the juveniles are found in the lower shore, which flooded by tide. This crab has been found to invade mangrove zones during high tide especially at night. Average density of adult crabs has been found to vary from 1 to 3 m⁻² and the maximum density recorded is 7 m⁻²

Distribution : India : Subarnarekha estuary, Gopalpur, Chilika, Mahanadi estuary (Orissa) and South 24 Pargonas, Purba Medinipore (West Bengal).

Elsewhere : Thailand and Myanmar

Remarks : This species is found living in the sand at the edge of the mouth of the Talsari beach round the year. The common name of the species is "Ghost crab."

44. *Ocypode ceratophthalma* (Pallas, 1772)

1772. *Cancer ceratophthalmus* Pallas, *Spicilegia zool.*, IX : 83, pl. 5, fig. 7

2005. *Ocypode ceratophthalma* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 500-501.

Material examined : 2 ex, 06.vii.2006, Udaypur, A. Misra & S. Mitra.

Diagnosis : Size : 47.0 mm, F = 11.0 mm, L = 39.00 mm. Carapace square and cubic; convex. Surface covered uniformly with small granules, chelipeds markedly unequal. The length of stridulating ridge more than half of the breadth of larger palm, this ridge consists of striae only, hairs less. Tips of finger of smaller cheliped pointed and sharp, surface of the external maxilliped tubercular.

Habitat : This crab has been found in sandy areas of littoral zone.

Distribution : India : Along the east and west coast of India and Lakshadweep.

Elsewhere : East coast of Africa, Madagascar, Mauritius, Maldives, Srilanka, Malaysia, Japan and Indonesia.

Remarks : Ghost crabs or red crab, *Ocypoda ceratophthalma* (Pallas) is distributed along the coastal area of West Bengal and Orissa. Its distribution is restricted to a stretch between 20 m. and 50 m in the high tide area in upper intertidal. During a faunistic survey in the coastal region of Udaypur, a small village adjacent to West Bengal border (about 5 km west of Digha), the authors came across a widespread habitat of this species. The said crabs occupying the entire region, during ebb tide, they occupied about 450 m. wide and about 1500 m in length. Population of this crab is counted as 7-8/ m on low tidal region, whereas 10-12/ m in upper intertidal region. A patch of 20-30 m width Supralittoral zone with fine dry sand is also found to be populated by the ghost crab. This observation is interesting since there was no record of this species from upper intertidal zone from this coastal belt It is presumed that *O. ceratophthalmua* prefers undisturbed intertidal sandy beach and hence it has migrated from the densely crowded tourists spot Digha in West Bengal and Talsari in Orissa.

45. *Uca (Deltuca) rosea* (Tweedie, 1937)

(Plate VII. B)

1937. *Gelasimus roseus* Tweedie, *Bull, Raffles Mus.*, 13 : 145, fig. 1f, 2c.

1995. *Uca (Deltuca) rosea*: Bairagi, *Ocypodidae : Hugli Matla Estuary, Estuarine Ecosystem Sereis*, Part-2 : 271.

Material examined : 8 ex, 04.iv.2007, Talsari; 2 ex. 14.x.2007, Kankrapal, 1 ex. 17.iii.2008. Kirtania, A. Misra & S. Mitra

Diagnosis : Carapace without antero-lateral margins; anterolateral angles acute and produced; dorso-lateral margins strongly converging; frontal groove narrow;

orbits, strongly oblique and with smooth floor; two grooves running almost entire length of major dactyl; chela tip forceps-like in large chela of male; gonopod with broad anterior and posterior flanges, inner process broad, flat and well developed. Second pair of walking legs comparatively larger than other pairs of legs. Dactylus of all walking legs with hair on both sides.

Habitat : The species lives in upper intertidal zone of the river and creek bank of soft muddy substratum. distribution pattern vary from place to place. It is distributed on the peripheral dykes of pounds and coastal flats. They take shelter in the small holes.

Distribution : India: Subarnarekha estuary (Orissa); South 24 Pargonas, Purba Medinipore (West Bengal); Andamans and Nicobar Islands.

Elsewhere : Pakistan; Myanmar; Malaysia; Indonesia; Singapore; Mergui Island and Gulf of Siam.

Remarks : The small, pink *Uca* crabs are quite common in the mud flats and mangroves of Talsari and Kirtania. They were very much well known but determined wrongly as *acuta* or *manii* or *triangularis* by various scientists. *Uca rosea* differs from true acute in having two long grooves on its dactylus of major chela, strongly oblique orbits, and smooth low floor of orbits.

46. *Uca (Tubuca) dussumieri* (H. Milne Edwards, 1852)

(Plate VII. C)

1852. *Gelasimus dussumieri* H. Milne Edwards, *Observations sur les affinités zoologiques et la classification naturelle des crustacés série 3*, **18** : 109-166.

1975. *Uca (Deltuca) dussumieri spinata* Crane, *Fiddler crabs of the World* : **36**, fig, 27c.

1995. *Uca (Deltuca) dussumieri spinata* : Bairagi, *Ocypodidae : Hugli Matla Estuary, Estuarine Ecosystem Sereis, Part-2* : 273.

Material examined : 3 ex, 04.iv.2007. Talsari; 5 ex, 17.iii.2008. Kirtania, A. Misra & S. Mitra

Diagnosis : Size : W = 13.0 mm, F = 2.0 mm, L = 16.0 mm. Carapace with short finely serrated antero-lateral margins, antero-lateral angle acute; dorso-lateral margins converging; tuberculate boss present on female carapace behind dorso lateral margins; front with sub marginal ridges well separated; gonopod with large anterior flange and small posterior one; in large male distal structure of gonopod easily visible.

Habitat : This species lives in soft muddy or silty substratum of low littoral zone in mangrove fringed canal and river banks.

Distribution : India : Subarnarekha estuary (Orissa) ; south 24 Pargonas, Purba Medinipore (West Bengal); Tamil Nadu; Andhra Pradesh; Andaman and Nicobar Island.

Elsewhere : Burma; Malaysia; Singapore; Thailand; Indonesia; China; Australia.

Remarks : Carapace is bluish-grey in life, large cheliped and walking legs pale yellow, young bright cobalt blue. This species appears to be abundant in Lower estuarine zone at Talsari area.

47. *Uca (Celuca) lactea* (de Haan, 1835)

(Plate VII. D & F)

1835. *Ocypode (Gelasimus) annulipes* de Haan, in : Siebold, *fauna. Japon* : 54, pl. 15, fig. 5.1975. *Uca (Celuca) lactea annulipes* Crane, *Fiddler crabs of the World* : 299, fig, 18a-c.2005. *Uca lactea* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 508.**Material examined** : 1 ex. 14.x.2007, Kankrapal. A. Misra & S. Mitra.; 9 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Size : W = 16.0 mm, F = 2.0 mm, L = 17.0 mm. Antero-lateral angles of carapace claw like, sharp; lateral sides of carapace defined by fine, raised convergent lines, in two thirds of their extent. Front between the eyestalks measured about one fifth or so of the maximum width of carapace. Fingers are not very broad and leave a wide gap when closed, tip of dactylus sharp, hook like and the tip of finger is notched.**Habitat** : The species lives in sandy or muddy sand substratum in the upper littoral zone. Lives at open sand flats bordering mangroves; also along banks of creeks; occurs among sparsely distributed mangroves.**Distribution** : India : Subarnarekha estuary, Mahanadi estuary (Orissa) ; South 24 Parganas, Purba Medinipore (West Bengal); Tamilnadu; Pondichery; Andhra Pradesh; Gujarat; Kerala; Maharastra; Andaman and Nicobar Islands.**Elsewhere** : Africa; Pakistan; Ceylon; Malaysia; Indonesia; Philippines and Madagascar.**Remarks** : Carapace black in life with 3 to 4 light blue transverse bands crossing the entire width, manus of the major cheliped reddish pink. Meri of walking legs and minor cheliped red or pale red in both sexes.48. *Uca triangularis* (H. Milne Edwards, 1873)

(Plate VII. E)

1873. *Gelasmis traingularis*H. Milne Edwards, *Nouv. Archs. Mus. Hist. nat. Paris, (N.S)* 9 : 275.1975. *Uca (Celuca) triangularis Bengali* Crane, *Fiddler crabs of the world*: 290, fig. 32 N-O., 68c2005. *Uca triangularis* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 509, pl. 3, fig. 8.**Material examined** : 4 ex, 05.vii.2006, Talsari; 3 ex. 02. iv. 2007, Kirtania, A. Misra & S. Mitra**Diagnosis** : Size : W = 14.0 mm, F = 2.0 mm, L = 16.0 mm. Carapace almost hexagonal in shape, very convex, posterior edge of crab less than half of its greatest width, hence the lateral borders strongly convergent and defined by a fine raised line

in more than two thirds of their extent. Eyes are small, eye-stalks are slender. Chelipeds in male are remarkable unequal but equal in female and colour of the major cheliped is yellow. Outer surface of arm, wrist and palm of major chelipeds is smooth in naked eye, cutting edge of both the fingers denate, fingers leaving a wide gap when closed. In minors chelipeds fingers distinctly longer than palm, gape is smooth and their tip with rush. Lower surface of merus and both the surface of propodus and dactylus with few hairs.

Habitat : Muddy substratum in upper littoral zone and often in shady place under mangrove. Distribution pattern vary from place. It is found to be distributed on the open sand flats between high water spring tide and mean low water neap tide; also it occurs along banks of creeks.

Distribution : India : Subarnarekha estuary (Orissa) ; South 24 Pargonas, Purba Medinipore (West Bengal) and Tamil Nadu, Pondichery.

Elsewhere : Australia, Myanmar and Malaysia.

Remarks : Carapace pale orange, major cheliped with yellowish manus, ambulatories are orange to yellow in both sexes. Simple hook like thumb finger of the palm indicates distinctly the *Uca triangularis* specimens are different from other allied species. This occurs on the bank of tidal streams of brackish water. Large populations have been observed along the roots of mangroves and on the mud of mangrove floor.

49. *Dotilla blanfordi* Alcock, 1900

(Plate VIII. A & C)

1900. *Dotilla blanfordi* Alcock, *J. Asiat, Soc. Bengal*, **69**(2): 366.

2005. *Dotilla blanfordi* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part-5) : 511-512.

Material examined : 2 ex, 03.iv.2007 Kankrapal. 12 ex. 04.vii.2006, Talsari, 15 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra.

Diagnosis : Size : W = 7.5 mm, F = 1.0 mm, L = 8.0 mm. Small cubical, hair less crab. Whole dorsal surface of the carapace grooved. A six rayed star of grooves of nearly equal length can be made out on the dorsal surface. Merus of external maxilliped twice as large as the ischium and its surface also grooved longitudinally. Chelipeds equal, stouter than the legs, fingers slender and slightly longer than the palm. Merus of legs with tympana; dactylus twice as long as the propodus.

Habitat : The species lives in sandy or sand mixed muddy substratum in lower and mid littoral zones. Burrows usually vertical on nearly vertical tubes closely packed together. These have often been found to co-exist with *Uca*, Molluscs etc. Average density of this species usually varies from 14 to 22 m⁻² and maximum density recorded is 33 m⁻².

Distribution : India : Both the coast of India.

Elsewhere : Pakistan and Indian ocean.

Remarks : Carapace and walking legs are grey in colour with pale yellow cheliped. A six rayed star of grooves on the dorsal surface of carapace at once separates this species from other species.

50. *Dotilla intermedia* de Man, 1888

1888. *Dotilla intermedia* de Man, *J. Lii. Soc. Zool.*, **22** : 135, pl. 9, figs. 4-6

2005. *Dotilla intermedia* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, **5**(Part-5) : 512.

Material examined : 4 ex, 13.X.2007, Kirtania, A. Misra & S. Mitra

Diagnosis : Carapace broader than long, chelipeds are twice in length of the carapace. Two oblique grooves extending from side of the cardiac region towards postero-lateral angle; palm much shorter about half the length of fingers, lower surface of the palm strongly carinated.

Habitat : The species lives in sandy or sand with muddy substratum in lower and mid littoral zones. Burrows usually vertical or nearly vertical tubes closely packed together.

Distribution : India : Bay Of Bengal, throughout the east coast of India.

Elsewhere : Mergui archipelago and Tavoy.

Subfamily MACROPTHALMINAE

51. *Macrophthalmus transversus* (Latreille, 1817)
(Plate VIII. B & D)

1817. *Gonoplax transversus* Latreille, *Nouv. Diet. d'hist. nat.*, 2 ed., t. **13** : 237.

1919 *Macrophthalmus transversus* : Kemp, *Rec. Indian. Mus.*, **16** : 386, pl. 24, fig. 1.

1995. *Macrophthalmus transversus* : Bairagi, *Ocypodidae : Hugli Matla Estuary, Estuarine Ecosystem Sereis*, Part-2 : 281.

Material : 2 ex, 12.x.2007, Talsari; 1 ex, 06.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Carapace much broader than long, lateral border posteriorly convergent; eye-stalk long and projecting beyond external orbital angle; frontal group narrow; upper orbital margin faintly convex and serrated along its half, suborbital margin projecting much forward and with minute denticles; lower surface of manus with a row of serrated crests of cheliped and dactyl with a large molar tooth near the base; branchial region with a four denticulated tubercles.

Habitat : Sandy silted mud in the lower and middle littoral zone.

Distribution : India : Orissa, West Bengal and Tamilnadu

Elsewhere : Africa and Indonesia

52. *Macrophthalmus (Macrophthalmus) brevis* (Herbst, 1804)

1804. *Cancer brevis* Herbst, *versuch. naturgesch. krabben. krebse.*, **3**(4) : 9, pl. 6, fig. 4

1915. *Macrophthalmus brevis*, Kemp, *Rec. Indian. Mus.*, **16**(5) : 392

2005. *Macrophthalmus (Macrophthalmus) brevis* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 516-517.

Material examined : 2 ex, 15.x.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Carapace quadrilateral, depressed about twice as broad as long, surface with exception of central gastric region cover with small to medium sized granules. Largest and densest anterolaterally and near furrow separating the cardiac and gastric regions, regions quite prominent. Lateral borders prominent, slightly convergent posteriorly and cut into two large and one small Antero lateral teeth, their margins beaded. Lateral teeth narrow and pointed strongly, eye-stalks extending upto the tip or projecting beyond the external orbital angle. Male abdomen triangular with a broad base fourth and fifth segment slightly convex or straight. Leg joints long fringed, with hairs first and last pair small, third largest and fourth shortest.

Habitat : Sandy silted mud in the lower and middle littoral zone.

Distribution : India : East-coast : Subarnarekha estuary (Orissa), Andhra Pradesh; Tamilnadu; West Bengal; Sundarban and West-Coast : Kerala.

Elsewhere : Indo-pacific; Mauritius, Arakan, Coast, Margui Archipelago, Singapore, Celebes and Moluccas.

Remarks : It is the first record of this species from Orissa Coast.

Family PORTUNIDAE

53. *Scylla serrata* (Forskal, 1775)

(Plate VIII. E)

1775. *Cancer serratus* Forskal, *Descr. Anim.*, p. 90.

1899. *Scylla serrata* Alcock, *J. Asiat. Soc. Bengal*, 68(2) : 27.

2005. *Scylla tranquebarica* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 420-421.

Material examined : 1 ex. 04.vii.2006, Talsari, 3ex. 17.iii. 2008, Kirtania, A. Misra & S. Mitra

Diagnosis : Size : Wide of carapace (W) = 112.0 mm, Front of carapace (F) = 22.0 mm, Length of carapace (L) = 80.0 mm. Antero-lateral border of carapace cut into 9 sharp acuminate teeth of nearly equal size. Front cut into four lobes or bluntish teeth of about equal size. Arm of larger cheliped adorned with 3 spines on the anterior border and 3 on the posterior border. Leg joints unarmed. Hand and surface of carapace smooth; hand inflated. Abdomen of male triangular, made up of 5 segments, 3rd - 5th joints fused. Body is dark greenish- grey in colour.

Habitat : lives in borrows of muddy creeks, channels or in puddles. This burrows are elliptical in shape, usually very deep having connection with water level. The burrows may extend down to about 1.5 m from the surface.

Distribution : India : East coast : Subarnarekha estuary, Chilka lake (Orissa); Purba Medinipore, Sundarbans (West Bengal); Kakinada Bay (Andhra Pradesh); Chennai, Palk Bay (Tamil Nadu); Ross Island (Andamans). West coast : Gulf of Kachchh (Gujarat); Mumbai, Goa, Karwar (Karnataka).

Elsewhere : East and South coasts of Africa, Red Sea, Pakistan, Sri Lanka, Thailand, Japan, China, Philippines, Indonesia, Australia, New Zealand.

Remarks : *Scylla serrata* is the common edible crab in India. It is known in Bengal as “Nona kankra” or “Mud crab” or the “salt water crab” It is generally a brackish water species, but can adapt to fresh water also. It is available at the Sundarban in large quantities through out the year. Another species naming *Scylla tranquebarica* available in Orissa and Tamil Nadu coast frequently, It is the larger than the previous one. The characters which differ from the previous species is a reticular green spot on the chelipeds and other appendages.

54. *Scylla tranquebarica* (Fabricius, 1798)

1798. *Portunus tranquebaricus* Fabricius, *Ent. Syst. Suppl.*, : 366.

2005. *Scylla tranquebarica* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 421-422. pl. 2. fig. 1.

Material examined : 1 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra.

Diagnosis : Size : Wide of carapace (W) = 112.0 mm, Front of carapace (F) = 22.0 mm, Length of carapace (L) = 80.0 mm. Antero-lateral border of carapace cut into 9 sharp acuminate teeth of nearly equal size. Front cut into four lobes or bluntish teeth of about equal size. Arm of larger cheliped adorned with 2 spines. Leg joints unarmed. Hand and surface of carapace smooth; hand inflated. Body is dark greenish grey in colour, on the legs and carapace hexagonal marks of pale green colour are prominent.

Habitat : lives in borrows of muddy creeks.

Distribution : India : East coast of India : Andhra Pradesh, Tamilnadu and Orissa.

Elsewhere : Pakistan, Malyasia, Singapore and Philippines.

Remarks : The population of this crab is relatively low in this estuary in respect to the *Scylla serrata*.

Family GRAPSIDAE

SubFamily VARUNINAE

55. *Varuna litterata* (Fabricius, 1798)

(Plate VIII. F)

1798. *Cancer litteratus* Fabricius, *Ent. Syst. Suppl.*, : 342.

1986. *Varuna litterata* Chakraborty, Choudhury and Deb, *J. Bengal nat. Hist. Soc.*, 5 : 61.

1995. *Varuna litterata* Ghosh, *Hugli Matla Estuary, Estuarine Ecosystem Sereis*, Part-2 : 247.

Material examined : 15 ex. 06.iv.2007, Talsari, A. Misra & S. Mitra ; 2 ex. 07.vii.2006, Kirtania, A. Misra & S. Mitra.

Diagnosis : Size : W = 28.0 mm, F = 6.0 mm, L = 26.0 mm. Carapace dorsally depressed, in middle of carapace makes a letter – H, edges thin and sharp. Front more than one third, the greatest breadth of carapace. Anterolateral borders arched and cut into three teeth. Last three joints of legs compressed and plumed for swimming. Propodus and dactylus of all walking legs are expanded and fringed with hair at the posterior margins.

Habitat : Usually the species lives at among dead corals, rocks and boulders. They climb up the still roots of mangrove up to a considerable height if chased, usually among surface of floating logs and rafts.

Distribution : India : Subarnarekha estuary (Orissa); South 24 Parganas, Purba Medinipore,; (West Bengal); Orissa; Bihar; Andhra Pradesh; Tamil Nadu; Kerala and Maharashtra.

Elsewhere : Bangladesh; Singapore; Hong Kong; Japan; Burma; Australia; New Zealand and East Africa.

Remarks : The species not only found in brackish water but also in fresh water and economically important as food consumed by the poor people. This species is locally known a “Chiti Kankra”

Subfamily SESARMINAE

56. *Metaplex dentipes* (Heller, 1865)

(Plate IX. A & Plate X. E)

1865. *Helice dentipes* Heller, *Crustacean der Novara Reise* : 62.

1995. *Metaplex dentipes* Ghosh, *Hugli Matla Estuary : Estuarine Ecosystem Sereis, Part-2* : 237.

Material examined : 2 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 1 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra.

Diagnosis : Carapace more than three fourths as long as broad; lateral border provided with four teeth; orbital portion of male cut into 4 or 5 teeth; though anterior border of merus of legs quite free from spines; sometimes there are inconspicuous spinules. First and fourth pair of legs are small than the second and third pairs. Second pair of legs are longest, carpus, propodus and dactylus of all walking legs fringed with hairs.

Habitat : Found to live in soft muddy areas of low tide level. The average density of this species is one per meter square area.

Distribution : India : Subarnarekha estuary (Orissa); South 24 Parganas, Purba Medinipore (West Bengal) and Eastern Coast of India.

Elsewhere : Mayanmar; Thailand and Sri Lanka.

57. *Metaplex crenulata* (Gerstaecker, 1856)

(Plate IX. B)

1856. *Rhaconotus crenulatus* Gerstaecker, *Arch. Nature, Jahrg.*, XXII(1) : 1421900. *Metaplex crenulata* Alcock, *J. Asiat. Soc. Bengal*, 69(2) : 4352005. *Metaplex crenulata* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 487. pl. 3, fig. 5.**Material examined** : 5 ex. 04.vii.2006, Talsari, 7 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Carapace about $\frac{3}{4}$ as long as broad. Front about $\frac{1}{4}$ of the greatest breadth of the carapace. Lateral borders of the carapace cut into 5 teeth and its anterior part distinctly attached. Anterior borders of carpus and propodus of legs spiny.**Habitat** : Found to live in soft muddy areas of high littoral zone to mid littoral zone. The average density of this species is 5-6 per meter square area.**Distribution** : India : Subarnarekha estuary, Mahanadi estuary (Orissa); South 24 Parganas, Andaman Islands and Andhra Pradesh.**Elsewhere** : Indian Ocean, Mergui archipelago, Malay Peninsula and Thailand.**Remarks** : Recorded only from the east coast of India.58. *Metaplex distincta* H. Milne Edwards, 1852

(Plate IX. C)

1852. *Metaplex distinctus* H.M. Edwards, *Ann. Sci. Nat. (Zool.) Ser. 3*, 18 : 162, pl. 4, fig. 27.2005. *Metaplex distincta* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 488-489.**Material examined** : 3 ex, 16.iii.2008, Talsari, A. Misra & S. Mitra**Diagnosis** : Orbital portion of male provided with nine or ten bilobulate teeth; anterior border of merus of first and last pair of legs with a single and middle two pairs with several spines. Male dactylus with out prominent lobe on its dentary edge and chelipeds markedly unequal but equal in same sex.**Habitat** : Found to live in soft muddy areas between the Middle and high tidal zone. The average density of this species is one per meter square area.**Distribution** : India : Subarnarekha estuary (Orissa); South 24 Parganas, Purba Medinipore,; (West Bengal); Andhrapradesh, Tamilnadu, Andaman Nicobar Is. Maharashtra and Karnataka.**Elsewhere** : Indian ocean; Mergui Island and Thailand.

59. *Metaplex indica* H.M. Edwards, 1852

(Plate IX. D)

1852. *Metaplex indicus* H.M. Edwards, *Ann. Sci. Nat. Zool. Ser.*, 3, 18 : 161.2005. *Metaplex indica* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 490-491.**Material examined** : 2 ex. 04.vii.2006, Talsari, 5 ex. 17.iii.2008, Kirtania.**Diagnosis** : Size : W = 29.0 mm, F = 8.0 mm, L = 22.0 mm.; Carapace about 2/3 as long as broad. Front about 1/3 of the greatest breadth of the carapace. Lateral borders of the carapace cut into 4 teeth. Male cheliped equal and smooth. 3-5 male abdominal segments fused together.**Habitat** : Found to live in soft muddy areas of low tide level.**Distribution** : India : Eastern Coast of India : Subarnarekha estuary (Orissa); South 24 Parganas, Purba Medinipore; (West Bengal); Visakhapatnam (Andhra Pradesh) and West coast of India : Maharashtra (Kolak).**Elsewhere** : Pakistan**Remarks** : The average density of this species is 5-6 per meter square area.60. *Seasarma quadrata* (Fabricius, 1798)

(Plate IX. E & Plate X. F)

1798. *Cancer quadrata* Fabricius, *Ent. Sys. Suppl.*, : 341.1995. *Metaplex dentipes* Ghosh, *Hugli Matla Estuary, Estuarine Ecosystem Series, Part-2* : 245.**Material examined** : 7 ex. 17.iii. 2008, Kirtania; 1 ex, 19.iii.2008 Talsari, A. Misra & S. Mitra**Diagnosis** : Carapace length being about 4/5 of its breadth. Dorsal surface flat and covered with hair. Lateral sides of carapace straight and without tooth. Upper surface of the male palm with two oblique combs like ridges.**Habitat** : Found to live in soft muddy areas Midtidal to high tidal area of the soft mud bank near the estuarine creeks. The average density of this species is one per meter square area.**Distribution** : Orissa, West Bengal, Andhra Pradesh, Andaman and Nicobar Is.**Elsewhere** : Pakistan, Sri Lanka and Myanmar.**Remarks** : The average density of this species is 2-3 per meter square area.

Subfamily GRAPSINAE

61. *Metapograpsus messor* (Forskal, 1775)

(Plate X. A & B)

1775. *Cancer messor* Forskal, *Descrip. Anim. in. itin. Orient* : 882005. *Metapograpsus messor* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 477-478. Pl. 3. fig. 3.**Material examined** : 4ex. 17.iii. 2008, Kirtania, A. Misra & S. Mitra**Diagnosis** : Front about 3/5 of the greatest breadth of the carapace. Free frontal edge beaded. lateral side of carapace entire. Inner angle of lower border of orbit denticulate. Last male abdominal segments triangular.**Habitat** : Found to live in soft muddy areas beside a rocks or concrete of jettys. Also live in the mangrove forest area.**Distribution** : India : Indo-Pacific. Subarnarekha estuary (Orissa); South 24 Parganas, Purba Medinipore (West Bengal) and throughout the coast of India.**Elsewhere** : Suez canal; Red Sea; Pakistan; Madagascar; Sri Lanka; Bangladesh; Myanmar; Australia and Hawaii.**Remarks** : The average density of this species is 4-6 per meter square area.62. *Grapsus albolineatus* Lamarck, 1818

(Plate X. C)

1818. *Grapsus albolineatus* Lamarck, *Hist. Nat. Anima. Sans. Vert.*, 5 : 2492005. *Metapograpsus messor* Dev Roy & Bhadra, *Fauna of Andhra Pradesh, State Fauna Series*, 5(Part-5) : 475-476.**Material examined** : 2 ex; 04.iv.2007; Talsari, A. Misra & S. Mitra**Diagnosis** : Carapace subcircular, derpressed, gastric region well outlined, branchial part bearing low smooth oblique redges, surface between these ridges smooth. Front deep, deflexed vertically, free edge nearly straight, front less than half of the greatest breadth of the carapace. Post frontal lobes four, chelipeds unequal strong. merus of the third maxillipeds longer than broad.**Habitat** : Found particularly beneath the jettys and boulder/rocks. Also on the trunks of Mangroves.**Distribution** : Indo-west Pacific. Along the east and west coast of India.**Elsewhere** : South Africa, Red Sea, Sri Lanka, Bangladesh, Philippines, Australia, Japan and Mergui archipelago.

V. Phylum MOLLUSCA

Class GASTROPODA

Order ARCHAEOGASTROPODA

Family TROCHIDAE

Sub family UMBONINAE

63. *Umbonium vestiarius* (Linnaeus, 1758)

(Plate XI. A)

1758. *Trochus vestiarius* Linnaeus, *Syst. Nat.*, ed. 10 : 758, sp. 515.2008. *Umbonium vestiarius* : Mahapatra, *Fauna of Krishna Estuary, Estuarine Ecosystem Series*, 5, p. 116.**Material examined** : 2 ex; 04.iv.2007; Talsari, A. Misra & S. Mitra; 4ex, 05.vii.2006, Talsari, A. Misra & S. Mitra ; 12 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra.**Diagnosis** : Shell brightly coloured, polished; spire depressed; umbilicus with large subcircular callous pad; shows polymorphism.**Habitat** : Subtidal area of the estuary mouth**Distribution** : India : Orissa (Subarnarekha estuary, Chilika, Gopalpur, Mahanadi estuary), Andhra Pradesh, Tamil Nadu, West Bengal, Kerala and Maharashtra.**Elsewhere** : Japan, Java, Indonesia, Pakistan, Persian Gulf, Philippines, Sri Lanka and New Zealand.**Remarks** : common name is button shell, collected and used in huge amount at locally for the preparation of decorative materials and also in shell industry as poultry feed and lime preparation.

Family NERITIDAE

64. *Nerita (Amphinerita) articulata* Gould, 1847

(Plate XI. C)

1847. *Nerita articulata* Gould, *Proc. Boston. Soc. Nat. Hist.*, 2 : 2201992. *Nerita (Amphinerita) articulata* Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 158. pl. 1 fig. 8 & 9.**Material examined** : 4ex, 05.vii.2006, Talsari, A. Misra & S. Mitra**Diagnosis** : Shell thick, semi globular with numerous growth striae, semicircles and crossed by finer spiral lines; spires represented by elevated portion of the body whorl, aperture crecent shaped, columella concave with 3-4 short teeth in the middle, outer lip margin with a deep inward slope, innerside thickened with 17-20 longitudinal elongated teeth, colour dark reddish grey, aperture yellowish white, outerlip fringed with black.

Habitat : Found attached with mangrove stems, wooden pillars, crevices and any hard substrata in the intertidal area.

Distribution : India : Orissa (Subarnarekha estuary, Mahanadi estuary), Andaman and Nicobar Islands and West Bengal.

Elsewhere : Indo-pacific.

Remarks : Found on the crevices and boulders near the high tidal zone. Also on the mangroves.

65. *Neritina (Vittina) smithi* Wood, 1828

(Plate XI. B)

1828. *Neritina smithi* Wood, *Index Text., Suppl.*, p. 26, pl. 8, fig. 11

1992. *Neritina (Vittina) smithi* Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 159. pl.1 fig.10 txt. fig.2.

Material examined : 4 ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra; 2 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra

Diagnosis : Shell oval, solid, dull brown in colour with strong black, longitudinal undulating bands. Aperture broad, columellar callus small and smooth, operculum semi lunar.

Habitat : Found on the crevices and plants of the mid tide mark to high tide mark of the intertidal area.

Distribution : India : Orissa (Subarnarekha estuary) and West Bengal.

Elsewhere : Myanmar (Irawaddy estuary).

Remarks : Occurs with in the same habitat of the previous species.

Family VIVIPARIDAE

66. *Bellamyia bengalensis* (Lamarck, 1822)

(Plate XI. D)

1822. *Paludina bengalensis* Lamarck, *Hist. nat. Anim. Sans. Vert.*, 6(2) : 174.

2008. *Umbonium vestiarius*: Mahapatra, A. *Fauna of Godavari Estuary, Estuarine Ecosystem Series*, 4 : 60.

Material examined : 11 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra; 7 ex. 05. iv. 2007, Pantei, A. Misra & S. Mitra.

Diagnosis : Shell elongate, with dark spiral bands; sutures not greatly impressed; aperture sub-circular; Body whorl perfectly rounded with conical spire.

Habitat : Fresh water area of the estuary, pond and marshes.

Distribution : Common throughout India.

Remarks : Shells of this species shows considerable variation and this species is used as food material by the local peoples.

Order MESOGASTROPODA

Family LITTORINIDAE

67. *Littorina (Littorina) undulata* Gray, 1839

(Plate XI. E)

1939. *Littorina undulata* Gray, *Zool. Beecheys Voy.*, p. 1401992. *Littorina (Littorina) undulata* Subba Rao et al., *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 165. pl. 3, fig. 2.**Material examined** : 12 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 15 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Upto 23 mm long, yellowish or buff coloured, marbled with brown marks, columella violet grey, sometimes white with brown bands.**Habitat** : Rocks and bolders. Found to crawl as epifauna in upper-tidal area.**Distribution** : India : Orissa, Tamil Nadu, West Bengal, Kerala and Karnataka, Goa, Gujarat, Lakshadweep and Andaman and Nicobar Island.**Elsewhere** : Japan, Java, Indonesia, Pakistan, Persian Gulf, Philippines, Sri Lanka and New Zealand.**Remarks** : This species are often found on the mangrove bushes up to one meter.68. *Littorina (Littorinopsis) melanostoma* Gray, 1839

(Plate XI. F)

1839. *Littorina melanostoma* Gray, *Zoology of captain Beechys 'Voyage H.M.S. blossom, Mollusks* : 1401992. *Littorina (Littorinopsis) melanostoma*: Subba Rao et al., *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 164. pl. 3, fig. 1.**Material examined** : 17 ex. 13.X.2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Shell conical, imperforate, thin, with 6-8 flat sided whorls; yellowish white in colour, some brown longitudinal markings between spiral striae arranged axially; body flattened; spiral tip black.**Habitat** : Usually found clinging to the branches and leaves of mangrove plants in estuaries.**Distribution** : India : Orissa (Subarnarekha estuary, Mahanadi estuary), Andhra Prades, Tamil Nadu, West Bengal, Kerala and Maharashtra.**Elsewhere** : Myanmar, Philippines and Sri Lanka.69. *Littorina (Littorinopsis) scabra scabra* (Linnaeus, 1758)

(Plate XII. A)

1758. *Helix scabra* Linnaeus, *Syst. Nat. ed.* 10 : 7702003. *Littorina (Littorinopsis) scabra scabra* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper*, 192 : 120, pl 19, fig. 8.

Material examined : 14 ex., 17. iii. 2008, Kirtania, A. Misra & S. Mitra.

Diagnosis : L = 7-9, D = 5-6; Shell solid, with variable colour pattern, Generally dark, violet gray to reddish brown, nodules white, columella reddish brown; sculptured with spiral cords and row of small nodules on the penultimate whorl and two rows on the last whorl; presence of spiral cords and axial growth lines; inside and outside of aperture with fine line and brown spots.

Distribution: India : Orissa : Subarnarekha estuary, Hukitiola, Chatrapur, Gopalpur; Godavari Estuary; Andamans; Goa; Karnataka : Mangalore; Kerala: Cochin; Maharashtra: Bombay; Tamil Nadu : Madras, Gulf of mannar, Tuticorin; West Bengal : Port Caning, Hugli-malta Estuary.

Elsewhere : Common throughout Indo-pacific (From South African coast to Philippines Islands).

Remarks : Found in the mangrove area, attached to stems and leaves of mangrove trees. Also occurs in the crevices in intertidal region.

Family STENOTHYRIDAE

70. *Stenothyra deltae* (Benson, 1836)

(Plate XII. B)

1836. *Nematura deltae* Benson, *J. Asiat. Soc. Beng.*, 5 : 782

1992. *Stenothyra deltae* Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 167. pl. 3 fig. 4.

Material examined : 4 ex. 06.iv.2007, Talsari., A. Misra & S. Mitra.

Diagnosis : Shell with flattened body whorl, sculptured with spiral punctated lines; aperture small, subcircular, periostracum thick and often with spiral rows of spine.

Habitat : Available on soft mud, where the water has very little salinity. Prefer the high tidal area.

Distribution : India : West Bengal and Orissa.

Family ASSIMINEIDAE

71. *Assiminia brevicula* (Pfeiffer, 1854)

(Plate XII. C & D)

1854. *Hydrocena brevicula* Pfeiffer, *Proce. Zool. Soc. Land*, P. 306

1995. *Assimineia brevicula* : Subba Rao. *et al.*, *Estuarine Ecosystem Series*, 2 : *Mollusca in Hugli Matla Estuary*, *Zool. Surv. India* : 57

Material examined : 7 ex. 01. iv. 2007, Talsari, A. Misra & S. Mitra.; 12 ex. 06.iv.2007, Talsari., A. Misra & S. Mitra;

Diagnostic Character : *Measurement* : L = 2-8, D = 3-9; Shell small, globose, thick, bright brickred or Yellowish coloured, 6-7 whorls, collumellar pillar whitish; Spire elevated.

Distribution : India : Orissa : Subarnrekha estuary; Andhra Pradesh : Godavari Estuary; Andaman and Nicobar Islands; Tamilnadu; West Bengal : Hugli malta Estuary.

Elsewhere : Borneo; Cebu; Malacca; Philippines and Singapore.

Remarks : Usually found to crawling on the mud.

72. *A. beddomeana* Nevill, 1880

1880. *Assiminea beddomeana* Nevill, *J. Asiat. Soc. Beng.*, **49**(2) : 163

1992. *Assiminea beddomeana* Subba Rao *et al. Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 169. pl. 3 fig. 11.

Material examined : 6 ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra; 4 ex, 15.x.2007, Talsari, A. Misra & S. Mitra.

Diagnostic Character: Shell depressed, turbinata with quadrate foramen, spire obtuse and depressed with five whorls, aperture globose.

Habitat : Muddy intertidal area of Talsari and Kirtania.

Distribution : India: North and south 24 Parganas (W.B.) and Subarnarekha Estuary (Orissa).

Elsewhere : Myanmar (Irrawady delta).

Remarks : Usually found to crawling on the mud.

Family TURRITELLIDAE

73. *Turritella attenuata* Reeve, 1869

(Plate XIII. A)

1869. *Turritella attenuata* Reeve, *Conch. lion. Turritella, sp.* No. 4, pl. 1 fig. 4

2003. *Turritella attenuata*: Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, **192** : 140, pl. 23 fig. 1

Material examined : 2 ex, 15.x.2007, Talsari, A. Misra & S. Mitra; 5 ex. 06.vii.2006, Udaypur, A. Misra & S. Mitra

Diagnosis : Shell measurement: L = 44-64, D = 10-14; Shell elongate, attenuate; whorls strongly single keeled bulged in the middle, with spirally raised striations. Upper part of whorls sloping, where as curved and constricted at lower part.

Habitat : Sandy intertidal area of Talsari and Udaypur.

Distribution : India : Orissa; Tamil Nadu; West Bengal : Medinipur.

Elsewhere : Eastern Sea.

Remarks : Generally found in littoral region at sandy littoral zone of the estuary mouth.

Super Family CERITHIOIDEA

Family POTAMIDIDAE

Subfamily POTAMIDINAE

74. *Cerithidea (Cerithideopsilla) cingulata* (Gmelin, 1791)

(Plate XII. E)

1791. *Murex cingulatus* Gmelin, *syst. Nat. ed.* 13 (6): 3561, sp. 1382003. *Cerithidea (Cerithideopsilla) cingulata* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper* No., 192 : 136 pi. 22, fig.2**Material examined** : 12 ex. 14.x. 2007, Kirtania, A. Misra & S. Mitra; 4 ex, 15.x.2007, Talsari, A. Misra & S. Mitra**Diagnosis** : Measurements : L = 18-31, D = 6-12; Shell narrow, elongate; Whorls with spiral and axial ribs; Columella not twisted; body whool with varix; Dark brown in colour.**Habitat** : Muddy intertidal area of Talsari and Kirtania.**Distribution** : India : Andhra Pradesh; Goa; Gujarat; Karnatak; Kerala; Maharashtra; Pondichery; Tamil Nadu and West Bengal.**Elsewhere** : Pakistan, Sri Lanka, Myanmar, Indonesia and Japan.**Remarks** : Common in the estuaries, back water and mangrove swamps along East and West coast of India.75. *Cerithidea (Cerithidea) obtusa* (Lamarck, 1822)

(Plate XII. F)

1822. *Cerithium obtusum* Lamarck, *Hist. Nat. Anim, Sanr, Vert.*, 7 : 712003. *Cerithidea (Certhidea) obtusa* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper*, 192 : 136, pl. 22, fig. 5, 6.**Material examined** : 3 ex. 19. iii. 2008, Talsari, A. Misra & S. Mitra; 7 ex, 15.x.2007, Talsari, A. Misra & S. Mitra; 2 ex. 13.x. 2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : size: L = 36-47, D = 19-25; Shell broadly elongate and round, yellowish in colour; apex blunt; sculpture with spiral threads and prominent traspiral ridges; aperture broadly rounded; outer lip thick and flattened.**Habitat** : Muddy intertidal area of Talsari and Kirtania.**Distribution** : India : Andhra Pradesh : Godavari Estuary; Andaman and Nicobar Islands; Orissa : Kasaphala, Chandipur, Mahanadi Estuary, False point, Goupalpur back waters and West Bengal : Medinipur, North and South 24 Parganas, Sunderban, Hugli-Malta Estury.**Elsewhere** : Indian Ocean to Western Pacific.**Remarks** : Found in mangrove area or in back waters generally seen to crawling on the mud or on plants which are wet with spring tides.

76. *Cerithidea alata* (Philippi, 1847)

1847. Philippi R.A. *Versuch einer systematischen Eintheilung des Geschlechtes Trochus*.
Zeitschrift für Malakozoologie 4 : 17-26

2006. Dey, A. *Handbook on Mangrove associate mollusc of Sunderban*, p. 33, figs. 33 & 34.

Material examined : 2 ex. 16. iii. 2008, Talsari, A. Misra & S. Mitra.

Diagnosis : Shell about 30 mm long , with 12-13 whorls; suture distinct, aperture elongately ovate, outer lip and inner lip meet posteriorly at a point beyond the shell pane; siphonal sinus hollow and short, outer lip reflects over the sinus; sculptured with rounded, somewhat rectangular, close set axial nodules, three on each whorl.

Habitat : Muddy intertidal area of Talsari.

Distribution : Orissa, Andaman Islands, Tamil Nadu, Andhra Pradesh and West Bengal.

Elsewhere : Indian Ocean

77. *Telescopium telescopium* (Linnaeus, 1758)

(Plate XIV. A)

1758. *Trochus telescopium* Linnaeus, *Syst. Nat. ed.* 10 : 760 sp. 521.

2003. *Telescopium telescopium* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 136, pl. 22 fig. 3.

Material examined : 3 ex. 13.x. 2007, Kirtania, A. Misra & S. Mitra; 5 ex, 12.x.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Shell broadly elongate; Whorls sculptured with spiral ribs; body whorl without varix; Collumella twisted and channeled; Labial lip acutely curved.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Mahanadi Estuary, Paradeep, Chilika lagoon, Gopalpur, Konark; Andhra Pradesh : Bhimilipatnam, Godavari Estuaries; Andaman and Nicobar Islands; Gujarat : Gulf of kutch, Kandla Port, Salya beach, Murdeswar; Kerala : Cochin; Pondichery : Karaikal; West Bengal : Hugli-Matla Estuary.

Elsewhere : Myanmar; Indonesia; Malaya Peninsula; Madagascar; North Australia; Philippines; Singapore and Sri Lanka.

Remarks : Commonly known as Horn shell, used in manufacture of lime. Extensively used as food in the Philippines (Talavers and Faustino : 1933). A common species found partly buried in the mud on mud flats, in small ditches or canals.

Family EPITONIIDAE

78. *Amaea (Acrilla) acuminata* (Sowerby, 1844)

1844. *Scalaria acuminata* Sowerby, *Proc. Zool. Soc. Lond.*, p. 12

1992 *Acrilla acuminata* Subba Rao et. al. *Fauna of West Bengal, Part-9* : 169. pl.3 fig.11.

2006. *Amaea (Acrilla) acuminata* Dey, *Handbook on Mangrove associate molluscs of Sunderban*, p.37. fig. 41 to 43.

Material examined : 3 ex. 06. vii. 2006, Udaypur; A. Misra & S. Mitra; 2 ex, 16.iii. 2008, Talsari, A. Misra & S. Mitra.

Diagnosis : Shell elongate, upto 30 mm; turreted, spire with ten whorls; body whorl with prominent keel at base; aperture obliquely ovate; sculptured with numerous fine vertical ribs; colour cream with two brown spiral bands.

Habitat : Mudflat at lower littoral zone.

Distribution : Orissa, West Bengal, Maharashtra, Pondicherry and Tamil Nadu.

Elsewhere : Indo-pacific.

Remarks : Found crawling on the mudflat where a little amount of the water is retained during the low tide.

Super Family NATICOIDEA

Family NATICIDAE

79. *Natica lineata* (Roeding, 1798)

(Plate XIII. B)

1798. *Cochlic lineata* Roeding, *Mus. Bolten.*, p. 147.

1972. *Natica lineata* : Cernohorsky, *marine shells of the pacific*, **2** : 96, pl. 25, fig. 5.

1992 *Natica lineata* Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 181. pl. 5 fig. 9.

Material examined : 3 ex. 01.iv. 2007, Talsari, A. Misra & S. Mitra;

Diagnosis : Shell globose, umbilicate, spire little elongated, whorls rounded, columella thin; spiral callus extends into umbilical grooves; aperture semicircular, umbilical space white; operculum with two marginal ribs and funicle well developed.

Habitat : Sandy shore of the estuarine mouth.

Distribution : India : Orissa, West Bengal, Maharashtra and Tamil Nadu.

Elsewhere : Pakistan, Australia, Malaya Archipelago and Philippines.

Remarks : Commonly called as moonshell; Population very less than the other species of *Natica*.

80. *Natica vitellus* (Linnaeus, 1758)

(Plate XIII. C)

1758. *Nerita vitellus* Linnaeus, *Sys. Nat. Ed.* **10** : 776, sp. No. 625.

1985. *Natica vitellus*: Mookherjee, *Rec. zool. Surv. India, Occ. Paper No.*, **75** : 42, p. 16. figs. 26 a & b.

1992. *Natica vitellus* Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 182. pl. 5 fig. 7.

Material examined : 1 ex. 06. vii. 2006, Udaypur; A. Misra & S. Mitra.

Diagnosis : Globose, thick, excavely umbilicated with inflated body whorls; whorls rounde, spire short, columella with polished callus extending posteriorly and fused with the bodywhorl leaving anteriorly the umbilical opening; funicle ill developed,

Habitat : Sandy shore of the estuarine mouth.

Distribution : Orissa, West Bengal, Andhra Pradesh, Tamil Nadu, Lakshadweep and Maharashtra

Elsewhere : China, Malaya Peninsula, Maruitus and Pakistan.

81. *Natica tigrina* (Roeding, 1798)

(Plate XIII. D)

1798. *Cochils tigrina* Roeding, *Museum Boltenianum* : 147, sp. 1843.

1952. *Natica tigrina* : Satyamurti, *Bull. ChennaiGovt. mus. New. Ser.* 1(2) pt. 6 : 108, pl. 8, fig.2.

1992. *Natica tigrina* Subba Rao *et al.* *Fauna of West Bengal*, Part-9 : 181. pl. 6 fig. 1 & 2.

Material examined : 1 ex, 16.iii. 2008, Talsari, A. Misra & S. Mitra.; 4 ex. 06. vii. 2006, Udaypur; A. Misra & S. Mitra;

Diagnosis : *Mesurements* : L = 23-31, D = 18-26; Shell globose, white or cream coloured with rows of chocolate brown sports, spire reduces and almost on the same level; Body whorl inflated and globular; Aperture semicircular; Umbilicus present and completed, filled by a callous; Columella not flattened; Collumellar callous very thick especially at its base.

Habitat : Sandy intertidal zone.

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Baleswar, Chandipur, Cuttack Coast; Andhra Pradesh : Godavary Estuary; Andaman and Nicobar Island; Gujarat : Pirotan Island (Gulf of Kutch); Kerala : Cochin; Maharashtra : Bombay; Tamil Nadu; West Bengal : Digah. Muriganga Estuary, Ganga Sagar in Sundarban, Medinipur, North and South 24 Parganas.

Elsewhere : Australia; China; Fiji, Pakistan; Phillipines; Japan; Persian Gulf; Sri Lanka; Malaysia : Penag; Myanmar : Akyab; Singapore; Hongkong; Indonesia and Java.

Remarks : Occurs in estuarine areas and sandy mud in shallow coastal areas.

82. *Polinices (Polinices) mammilla* (Linnaeus, 1758)

1758. *Natica mamilla*, Linnaeus, *Syst. Nat. Ed.* 10.

2003. *Polinices (Polinices) mammilla*: Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 190, pl.38, fig. 3,4.

Material examined : 2 ex. 04. vii. 2006, Talsari, A. Misra & S. Mitra.

Diagnosis : Measurements : L = 12-32, W = 11-22; Shall pyriformly ovate; Ivory white in colour; spire reduced; body whorl inflated; aperture semicircular; Umbelicus closed; Length more than breadth.

Habitat : Sandy intertidal zone.

Distribution : India: Andaman and Nicobar Islands; Goa; Kerala; Lakshadweep; Maharashtra; Orissa : Chahndipur, Paradeep, Puri Coast; Tamil Nadu : Chennai, Krusadai Island, Kundugal point, shingle Island, Rameswaram, Tuticorin, Tranquebar, Tiruchedur.

Elsewhere : Indo-West Pacific.

Remarks : Common in shallow waters.

Synonym : *Natica mamilla* (Linnaeus), *Polinices tumidus* (Swainson).

83. *Polinices (Glossaulax) didyma* (Roeding, 1798)

(Plate XIII. E)

1798. *Albula didyama* Roeding, *Museum Boltenianum* : 29, sp. 145 (refers chemnitz, 1781, pl. 186, figs. 1856.

1985. *Polinices (Glosaulax) didyma* : Mookherjee, *Rec. zool. Surv. India, Occ. Paper No.*, 75 : 54, pl. 9, fig. 37.

Material examined : 5 ex. 04.iv.2006, Talsari, A. Misra & S. Mitra; 4 ex. 16. iii. 2008, Talsari, A. Misra & S. Mitra; 3 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra.

Diagnosis : Measurements : L = 15-25, W = 15-17; Shall large, thick, globose, slightly laterally compressed; whorl rounded with oblique growth; aperture semioval; parietal callous dark brown with a deep groove.

Habitat : Sandy intertidal zone.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Mahanandi Estuary nr. Paradeep, Puri; Andhra Pradesh : Godavary Estuary; Gujarat : Pirotan Island in Gulf of Kutch; Maharashtra : Bombay, Tamil Nadu : Madras, Krusadai Island, Kundugal point; West Bengal : Digha, Medinipur, South 24 Parganas.

Elsewhere : Hawai Island; Japan to Natal; Common in Fiji; Queensland, Australia to Indian Ocean.

Remarks : In young shells width is more than lengths. But in shall above 50mm, length is more than width.

Family ARCHITECTONICIDAE

84. *Architectonica perspectiva* (Linnaeus, 1755)

(Plate XIII. F)

1755. *Trochus perspectiva* Linnaeus, *Syst. Nat.* Ed. 10 : 757.

1952. *Architectonica perspectiva* Satyamurti, *Bull. Madras. Gov. Mus., new. ser.* 1, 2. pt. 6. p. 72.

1992. *Architectonica perspectiva* Subba Rao et. al. *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 172-173. pl. 4 fig. 5 & 6.

Material examined : 3 ex, 6.vii.2006, Udaypur, A. Misra & S. Mitra.

Diagnosis : Shell thick, broad, flattened base and depressedly conical spire,; whorls inflated and perfectly straight; each whorl with distinct rib at the lower edge; bodywhorl sharply angular.

Habitat : Lower and sublittoral sandy zone.

Distribution : India: Orissa, West Bengal and Tamil Nadu.

Remarks : Found very rare in this area, only occasional observation at the lower tidal area.

Family TONNIDAE

85. *Tonna dolium* (Linnaeus, 1758)

1758. *Buccinum dolinaeus*, *Syst. Nat., ed*, 10 : 735.

2003. *Tonna dolium* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 194, pl. 41. fig. 7.

Material examined : 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : Measurements : L = 65-83, D = 29-55; Shell ovately ventricose; body whorl globular; Spire conical, depressed; aperture wide; sculpture of board, flat spiral ridges alternating with spiral threads; ridges maculated with brown spots on white back ground.

Habitat : Lower and sublittoral sandy zone.

Distribution : India: Orissa: Subarnarekha estuary, Chandipur, Paradeep, Mahanadi Estuary; Andhra Presaesh : Godavary Estuary; Andaman and Nicobars : Nicobar Islands; Maharashtra : Bombay; Timil Nadu : Madras, Pamban, Kursadai and Shingle Islands : West Bengal : Medinipur, North and south 24 Parganas.

Elsewhere : Sri Lanka; China; Philippines; Fiji and New Zealand.

Remarks : Commonly known as Tun shell; prefers deeper, waters; occasionally found into intertidal region at lower tidal area.

Family BURSIDAE

86. *Bursa spinosa* (Lamarck, 1843)

(Plate XIV. B)

1843. *Ranella spinosa* Lamarck. *Hist. Nat. Anim. Sans, Vert.*, 9 (*Deshayes ed*) p. 545.

1985. *Bursa spinosa* : Mookherjee, *Rec.zool. Surv. India, Occ. Paper No.*, 75 : 82, pl. 15. fig. 58

1992. *Bursa spinosa* Subba Rao et. al. *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 158. pl. 6 fig. 3.

Material examined : 2 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra; 7 ex. 13.X.2007, Kirtania, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 31-64, D = 17-36mm; Shell large with elevated spire; varices development into strong spires at regular intervals with close set spiral ridges and spinose nodes; Spire directed backward; aperture creamy coloured and canaliculated on both sides; outer lip flesh brown coloured and with irregular denticulations.

Habitat : Rocks and boulders even on the jetties along the intertidal area.

Distribution : India : Andaman and Nicobar Island; Gujarat; Kerala; Maharashtra; Orissa : Subarnarekha estuary, Mahanadi Estuary and Tamil Nadu.

Elsewhere : Myanmar; Java and Philippines.

Remarks : Found on rocky substratum near mesolittoral zone. Commonly known as spiny frog shell.

87. *Bursa rana* (Linnaeus, 1758)

1758. *Murex rana* Linnaeus, *Syst. Nat.*, ed. 10 : 748, sp. 452

2003. *Bursa (Befonaria) rana* : Subha Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 213, pl. 48. fig. 8, 9.

Material examined : 1 ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra; 7 ex, 15.x.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Measurements : L = 60, D = 35; shell narrow; Outer lip region in the form of a wing; varices with spires; presence of spiral rows of spinose, tubercles; anterior canal broad.

Habitat : Same habitat as *B. spinosa*.

Distribution : India : Orissa : Subarnarekha estuary; Baleswar Bay, Chandipur, Cuttack coast, Puri Coast; Tamil nadu : Madras, Porto Novo, Parto Novo, Pamban and West Bengal : Sand Heads nr. Hooghly mouth;

Elsewhere : Persian Gulf and Indo-Pacific region

Remarks : This species has got similarities with *Bursa spinosa* but differ in having short spines and spire.

Synonym : *Bursa elegans* Sowerby, 1838. (*B. elegans* is smaller, differ in sculpture, Nodules on the shoulder are large and sharper on the varices they are smaller).

Order NEOGASTROPODA

Family MURICIDAE

88. *Thais lacera* (Born, 1778)

(Plate XIV. C)

1778. *Murex lacera* Born, *Index Rerum nature. Musei. Caes Vindob.*, 308

2003. *Thais lacera* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.* 192 : 244, Pl. 58. fig. 5.

Material examined : 6 ex. 02. iv. 2007, Kirtania Jetty, A. Misra & S. Mitra; 2 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 24-43, D = 16-22; Whorls sharply angulate, carinate; body with two rows of spinose tubercles; surface of shell with spiral ribs and grooves; aperture denticulate inside on outer lip.

Habitat : Its preffer rocky area in the intertidal beaches throughout the sandy and mud mixed sandy area of Talsari to Kirtania.

Distribution : East and West Coast of India.

Elsewhere : East-Africa to Japan.

Remarks : Occurs in brackish and estuarine waters.

Synonym : *Cymia lacera*, *Thais carinifera*, *Cymia carinifera*.

89. *Rapana rapiformis* (Born, 1778)

1778. *Murex rapiformis* var. Born, *Index rerum naturalium musiei Caesarei vinodobonensis*, pl. 1.

2003. *Rapana rapiformis* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, **192** : 236, pl. 56. fig. 3.

Material examined : 2 ex. 04.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Measurement, L = 63, D = 54; Pyriform shell with 4 to 5 whorls and short spire; Outer lip denticulate; sculptured with three prominent rows of tubercles.

Habitat : Lower littoral area of Sandy zone of the estuarine mouth.

Distribution : India : Andaman and Nicobar Islands; Gujarat; Orissa : Mahanandi Estuary; Pondichery; Tamil Nadu and West Bengal : Medinipur.

90. *Murex tribulus* Linnaeus, 1758

(Plate XIV. D)

1758. *Murex tribulus* Linnaeus, *Syst. At. Ed.* **10** : 746.

1977. *Murex tribulus* : Ray, *Contribution to the knowledge of the molluscan fauna of Maungmagan, Lower Burma* : 46

Material examined : 8 ex. 01.iv. 2007, Talsari, A. Misra & S. Mitra;

Deagnosis : Measurement : L = 65-75, D = 23-27; Shell club shaped; Spire acute with 6-7 whorls; Body whorl globose; Varices with long spire; Aperture large, outer lip erect with limited crenulations; Canal elongate and narrow.

Habitat : Prefers sandy mud area beside the tributaries of Subarnarekha rivermouth.

Distribution : India : very common on both the coasts of India.

Elsewhere : Red sea to Philipines and Japan.

Remarks : Highly variable in colour and show polymorphism. Found in the marine and estuarine littoral region.

Family MELONGENIDAE

91. *Pugilina (Hemifusus) Cochlidium* (Linnaeus, 1758)

(Plate XIV. E)

1758. *Murex cochlidium* Linnaeus, *Syst. Nat. ed.* 10 : 753. sp. 482.

2003. *Pugilina (Hemifusus) cochlidium* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 274, pl. 66, fig. 3,4.

Material examined : 1 ex. 06. iv. 2007, Talsari, A. Misra & S. Mitra; 2 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 40-88, D = 20-51; Shell large, redish brown in colour, pear shaped; Spire high; Whorl angulate; aperture narrow and elongate; presence of axial ribs on the spire whorls; presence of about eight compressed tubercles at the angular shoulder of the last two whorls.

Habitat : Generally found in the muddy lower littoral areas in estuaries.

Distribution : India : East and West Coast.

Elsewhere : Indian occan.

Remarks : It is very rare in this area but fairly common at Digha Mohana region.

Family NASSARIIDAE

92. *Nassarius foveolatus* (Dunker, 1847)

1847. *Buccinum foveolatum* Dunker, *Zeit. F. Malakozool.*, 4 : 63,

2003. *Nasarius (Zeuxis) foveolatus*: Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.* 192 : 271, pl. 65, fig. 5.

Material examined : 4ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra; 4ex, 05.vii.2006, Talsari, A. Misra & S. Mitra..

Diagnosis : Measurement : L = 15-22, D = 8-10; Shell oblong; Colour yellowish brown, surface of the shell smooth but fine axial ribs restricted to spiral whorls only; suture channeled; inner lip less curved.

Habitat : Lower and Middle littoral area of muddy zone of the estuary.

Distribution : India : Orissa : Subarnarekha estuary, Chilika Lagoon; Andhra Pradesh : Godavari Estuary; Kerala : Khozikode; Maharashtra : Bombay; Tamil Nadu : Chennai and West Bengal : Hugli-Matla Estuary, Ganga Sagar.

Elsewhere : Mayanmar : Chaduba, Akyab; Hong Kong : Malaysia : Penang; Mauritius and Sri Lanka.

Remarks : Generally found crawling on mud flat in Estuary.

93. *Nassarius (Hima) stolatus* (Gmelin, 1791)

(Plate XIV. F)

1791. *Buccinum stolatus* Gmelin, *Syst Nat.*, ed. 13 : 3496. Sp. No. 1212003. *Nassarius stolatus*: Subba Rao, *Rec. zool. surv. India Occ. Paper No. 192* : 267. pl. 65. fig. 6, 7.**Material examined** : 2ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Measurement : L = 7-22, D = 4-14; Shell small, Yellowish white in colour with three broad chest nut spiral bands, ovately conical in shape; Inflated body whorl; pointed spire, few spire cords below suture.**Habitat** : Lower and Middle littoral area of muddy zone of the estuary.**Distribution** : India : Orissa : Subarnarekha estuary, Chilika lagoon, Mahanadi Estuary (Hukitola); Andhra Pradesh : Kakinada Bay, Godavari Esturay, Maharashtra : Bombay; Tamil Nadu : Tranquebar, Pamban, Chennai and West Bengal : Kolkata, Sagar Island, Digha, Hugli Matla Estuary.**Elsewhere** : Gulf of Aden; Persias gulf, Red Sea to Philippines and to Japan.**Remarks** : Similarity with *N. Jacksonianus* spiral ridges are more prominent in juvenile form.

Family OLIVIDAE

94. *Olivancillaria gibbosa* (Born, 1778)

(Plate XV. A)

1778. *Voluta gibbosa* Born. *Index reum naturalium music Caesanei Vindobonesis*, P. 202.2003. *Olivancillaria gibbosa* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 292, pl. 72, fi. 14.**Material examined** : 8 ex. 06.iv.2007, Talsari., A. Misra & S. Mitra; 2 ex. 01. iv. 2007, Talsari, A. Misra & S. Mitra; 2ex, 15.x.2007, Talsari, A. Misra & S. Mitra.**Diagnosis** : Measurement : L = 43-63, W = 22-34; Shell thick and ovate in shape; spire short; suture not canaliculated; columella callous; aperture narrow and elongated; highly polished siface.**Habitat** : Lower littoral and sublittoral sandy area.**Distribution** : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Chandipur, Cuttack Coast (Lion's Rumph, Paradeep), Puri coast, Chilika Lagoon, Ganjam coast (Chatrapur); Andhra Pradesh : Visakhapatnam, Kakinada, Pulicat lake; Andaman and Nicobar Ishland; Gujarat : Gulf of Kutch; Maharashtra : Bombay; Tamil Nadu : Chennai, Pamban, Krusadai Island, Palk Bay.**Elsewhere** : East and West Africa; Sri Lanka; Mayanmar : Akyab Maungmagan; Gulf of Thailand and Philippines.**Remarks** : It differ from other species by having gibbous shape towards upper part of body whorl and prominent colour zones at anterior part.

95. *Amalda ampla* (Gmelin,1791)

(Plate XV. B)

1791. *Voluta ampla* Gmelin, *Syst. Nat.* , ed. 13, p.3467.1982. *Amalda ampla*: Abbott & Dance, *Copmendium of Sea shells*, p. 195.

Material examined : 4ex, 05.vii.2006, Talsari, A. Misra & S. Mitra; 12 ex. 19.iii.2008, Udaypur, A. Misra & S. Mitra.

Diagnosis : Shell elongate, slender, smooth and highly polished, spire elevated; sutures densely covered with callous; columella slightly twisted; aperture narrow and elongated; colour milky white.

Habitat : Midlittoral sandy zone of the estuary (Talsari and Udaypur)

Distribution : India : Through out the esat coast and Maharashtra.

Elsewhere : Sri Lanka

Remarks : It is a very common species of the intertidal sandy beaches of South eastern coast. It is used as commercial purpose for preparation of decorative materials.

Family TURRIDAE

96. *Turricula javana* (Linnaeus,1767)

(Plate XV. C)

1767. *Murex javanus* Linnaeus, *Syst. Nat.*, ed. 12 : 1221. Sp. 550

2003. *Turricula javana* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 324, pl. 84, fig. 8, 9.

Material examined : 6 ex; 04.iv.2007; Talsari, A. Misra & S. Mitra; 2ex. 16.iii.2008, Talsari, A. Misra & S. Mitra

Diagnosis : Measurement : L = 30 mm, D = 12 mm.; Shell large; brownish In colour; spire high; aperture broad; presence of two narrow spiral ridges below suture; whorls rounded in middle.

Habitat : Intertidal sandy beach, Mid littoral to lower littoral area.

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Chandipur, Cuttack Coast, Lion's Rumph, Puri coast, Chatrapur (Ganjam Coast); Andhra Pradesh : Visakhapatnam; Andaman and Nicobar Islands; Gujarat : Gulf of kutch; Goa; Kerala; Maharashtra : Bombay, Devgarh; Tamil Nadu : Chennai, Tranquebar and West Bengal : Sand heads.

Elsewhere : Tanzania : Dar es Salam; Persian Gulf; Pakistan : Krachi; Sri Lanka; Malacca; Penang; Thailand; China; Philippines. Ranges from south West India to Southern China (Powell, 1969)

Famiy TEREBRIDAE

97. *Terebra tenera* Hinds, 1843

1843. *Terebra tenera* Hinds, *Proc. Zool. Soc. Lond.*, p. 158.

1992. *Terebra tenera* Subba Rao *et. al.*, *Fauna of West Bengal*, Part-9 : 200-201.

Material examined : 2 ex; 06.iv.2007; Talsari, A. Misra & S. Mitra.

Diagnosis : Length 7.5 mm; Diameter 2.4mm and Hight 1.7mm ; Shell small, short, stoutle subulate and turreted; dull whitish or pale cream colour; spire longer than the body whorl,; whorls 9-10 , separated from one another by very minute and oblique sutures; sculptured with narrow, strong , regular longitudinal ribs; aperture small and oblong; columella arched above with thin outerlip.

Habitat : sandy shore.

Distribution : India : Orissa and West Bengal.

Elsewhere : Sri Lanka and Malacca.

Remarks : Shells are very minute and found to cerawl in the exposed sandy beaches at Talsari and Udaypur.

Family CANCELLARIIDAE

98. *Scalptia scalariformis* (Lamarck, 1822)

1822. *Cancellaria scalariformis* Lamack, *Hist. nat. Anim. Sans. Vert.*, 7 : 113.

1982. *Scalptia scalariformis*: Abott & Dance, *Compendium of Sea Shells*, p. 226.

1992. *Scalptia scalariformis* Subba Rao *et al.* *Fauna of West Bengal*, Part-9 : 196-197 pl.8, fig. 8.

Material examined : 6 ex; 04.iv.2007; Talsari, A. Misra & S. Mitra; 2ex. 16.iii.2008, Talsari, A. Misra & S. Mitra

Diagnosis : Length 21.5 mm;Diameter 14 mm; Height 11.5 mm; shell pyramidal, scarcely umbilicated; spire acuminate; whorls flatly excavated at the suture and obliquely ribbed; ridges spirally crenate; aperture small, columella with three plaits; outerlip inflated.

Habitat : Intertidal sandy area.

Distribution : Orissa, Andhra Pradesh and West Bengal.

Elsewhere : Australia.

Order ENTAMOTAENIATA

Family PYRAMIDELLIDAE

99. *Odostomia oxia* Watson, 1886

1886. *Odostomia oxia* Watson, *Rep. Sci. Res. Challenger*, (200l)., No. 15, p. 404. pl. 31. fig. 4.

1992. *Odostomia oxia* Subba Rao *et. al.* *Fauna of West Bengal*, Part-9 : 202-203 pl.9, fig. 8 & 9.

Material examined : 7 ex, 15.x.2007, Talsari, A. Misra & S. Mitra.; 3 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra.

Diagnosis : Length 2.5 mm; Diameter 1.4 mm; Height of the aperture 1.2 mm; Shell small, smooth, ovate with 3-4 whorls; suture deep; columella with single fold; outerlip depressed at the anterior, forming a notch like structure.

Habitat : Sandy mid littoral area along the *Donax* bed.

Distribution : Orissa and West Bengal.

Elsewhere : Australia.

Remarks : Found attach to the posterior end of the small bivalve *Donax incurvatus*.

Family AGLAJIDAE
100. *Melanochlamys* sp
(Plate XV. D)

Material examined : 9 ex, 05.vii.2006, Talsari, A. Misra & S. Mitra; 13 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra; 6 ex, 15.x.2007, Talsari, A. Misra & S. Mitra;

Diagnosis : Length 11 mm; width 3 mm; Externally blackish in colour, the head shield elongate and occupies almost half of the length of the body; anteriorly rounded and narrow, and posteriorly broad and truncate; posterior shield elongate, with short rounded caudal lobes separated by a notch; shell internal, calcified and occupies major portion of the posterior shield; buccal mass thick and devoid of jaws.

Habitat : Sandy intertidal zone at Talsari and Udaypur.

Distribution : Orissa and West Bengal.

Elsewhere : This genus is distributed from Japan to South Africa.

Remarks : This is the second report of this genus from Indian waters; Previously Subba Rao *et al.* reported this species from West Bengal. This species were seen to crawl on the exposed sandy portion of the estuarine mouth. It is the first record of this genus from Orissa coast.

Order NOTAPSIDEA
Family PLEUROBRANCHAEDAE
101. *Pleurobranchaea* sp.
(Plate XV. E)

Material examined : 3 ex; 04.iv.2007; Talsari, A. Misra & S. Mitra; 2 ex. 16.iii.2008, Talsari, A. Misra & S. Mitra

Diagnosis : Body colour is fleshy; Length 61mm; width 28.5 mm; Body elongately ovate with protruded anterior buccal part, mantle ovate and covers the body; oral tentacles fused to form oral veil; foot broad anteriorly and tapering posteriorly which

extends beyond the margin; ctenidium pectinate with 36/35 lamellae situated on the right side between foot and mantle; anal opening hidden by upper row of ctenidium;

Habitat : Lower littoral sandy zone at Talsari.

Distribution : Orissa and West Bengal and Tamil Nadu.

Remarks : This species is seems to be rare in this area.

Order NUDIBRANCHIA

Family ARMINIDAE

102. *Armina* sp.

(Plate XV. F)

Material examined : 3 ex. 19.iii.2008, Talsari, A. Misra & S. Mitra

Diagnosis : Fleshy coloured striped body; Dorsal surface almost plain without ridges or lines. An expanded oral velum; rhinophores withdrawn completely; foot broad anteriorly and pointed towards posterior end; mouth situated anteriorly on a round thickening in front of foot; anteriorly on either side of the foot margin 15-16 gills followed by 37-38 lamellae;

Habitat : Lower littoral sandy zone at Talsari.

Distribution : Orissa and West Bengal and Mharashtra.

Subclass OPISTHOBRANCHIA

Order CEPHALSPIDEA

Family HAMINEIDAE

103. *Haminoea crocata* (Reeve, 1860)

1860. *Bulla (Haminoea) crocata* Reeve, *Proc. Zoo. Soc. Lond.*, p. 19.

2003. *Haminoea crocata*: Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, **192** : 354, pl. 94, fig. 2, 3.

Material examined : 2ex. 13. x. 2008, Kirtania, A. Misra & S. Mitra; 6 ex, 05.vii.2006, Talsari, A. Misra & S. Mitra.

Diagnosis : *Measurement* : L = 7-13, W = 5-10; Shell thin, fragile; oval shape; smooth surface; aperture oval towards lower part; Posterior end broad; Semi transparent and light blue in colour, muscular foot of the juvenile is pure red in colour.

Habitat : Lower littoral Mud area.

Distribution : India : Orissa : Subarnarekha estuary, Puri Coast; Chilika Lagoon (Satapada); Tamil Nadu : Chennai and West Bengal : Ganga Sagar Island, South 24 Parganas, Hugli Matla Estuary.

Elsewhere : Sri Lanka; New South Wales; South Africa : Natal.

Remarks : Found on the muddy areas. Most part of the shell is covered by red coloured foot and mantle during live condition.

Subclass GYMNOMORPHA

Order SOLEOLIFERA

Family ONCHIDIIDAE

104. *Onchidium typhae* Buchanan, 1800

(Plate XVI. A)

1800. *Onchidium typhae* Buchanan, *Trans Linn. Soc. Lond.*, **5** : 1321992. *Onchidium typhae*: *Fauna of West Bengal*, Part-9 : 213-214, pl. 13, fig. 3 & 4.**Material examined** : 6 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Length = 42.7 mm, Width = 18 mm. Body narrow and elongated during crawling; with obtuse anterior and posterior end; mantle greenish with various shade upward, numerous smaller and larger tubercles distributed throughout the dorsal surface; the top of the tubercles with 2-4 black dots; foot narrow, greenish yellow in colour and narrower than mantle.**Habitat** : Littoral muddy substrata.**Distribution** : India : Subarnarekha estuary (Orissa) and Hugli Matala Estuary (West Bengal).**Remarks** : Generally inhabit salt marshes and Estuary; crawling on damp mud bank and on the roots of the mangrove trees.103. *Onchidium tenerum* Stoliczka, 1869

(Plate XVI. B)

1869. *Onchidium tenerum* Stoliczka, *J. Asiat. Soc. Beng.* , **38** : 107, pl. 15, fig. 3.1992. *Onchidium tenerum* : Subba Rao *et al.* *Fauna of West Bengal*, Part-9 : 212-213, pl. 12, fig. 3 & 4.**Material examined** : 5 ex. 07. vii. 2006, Kirtania, A. Misra & S. Mitra; 6 ex, 06.iv. 2007, Talsari, A. Misra & S. Mitra.**Diagnosis** : Body oval, more or less elongated at the time of movement, soft and pulpy; Mantle greenis grey with dark spot and finely granular; eyes black and centrally situated in transverse fold; eye pedicles stout at the base with distinct swollen, granular tips; pulmonary orifice situated at the posterior end of the mantle.**Habitat** : Found crawling on the dykes, and boulders.**Distribution** : Orissa and West Bengal.**Remarks** : Generally inhabit salt marshes and Estuary; crawling on damp mud bank and on the roots of the mangrove trees.

Subclass PULMONATA
Order ARCHAEPULMONATA
Family ELLOBIIDAE

106. *Ellobium gangeticum* (Pfeiffer, 1855)
(Plate XVI. C)

1855. *Auricula gangetica* Pfeiffer *Malak Blatt.*, 2 : 7.

2003. *Ellobium gangeticum* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, 192 : 170, pl. 95. fig. 6.

Material examined : 2 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 9-26, D = 6-11; Shell fusiformly ovate; thin; whorls tumid; columella with two folds.

Habitat : Muddy littoral area and in the scanty zone of the mangroves.

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi Estuary; Godavari Estuary; Maharashtra : Bombay; Tamilnadu : Vellar Estuary and West Bengal : Sunderbands, Hugli Matala Estuary.

Elsewhere : Myanmar : Irrawady Delta and Sri Lanka.

Remarks : Shall smaller than *E. aurisjudae* (upto 30 mm in height). Generally inhabit in salt marshes and estuary crawling on damp mud bank and among foots of the mangrove trees.

107. *Cassidula nucleus* (Gmelin, 1791)
(Plate XVI. D)

1791. *Auricula nucleus* Gmelin, *Syst. Nat.* ed. 13, p. 3651.

2003. *Cassidula nucleus*: Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.* 192 : 370, pl. 95, fig. 1.

Material examined : 3 ex. 02. iv. 2007, Kirtania, A. Misra & S. Mitra; 2 ex, 03.iv. 2007., Kankrapal, A. Misra and S. Mitra 2 ex, 13.x. 2007, Kirtania, A. Misra & S. Mitra.

Deagnosis : Measurement : L = 11-28, D = 7-17; shell small, thick and ovate in shape; short spire; Convex body Whorl and angular at the shoulder; aperture narrow and longer than the spire; Outer lip thick; presence of denticulation (up to three); Columella with a callous shield.

Habitat : Muddy littoral area and in the scanty zone of the mangroves.

Distribution : India : Orissa : Subarnarekha estuary; West Bengal : North and South 24 Parganas, Hugli-Matla-Matla Estuary; Maharashtra and Tamil Nadu : Pichavaram mangroves.

Elsewhere : Myanmar.

Remarks : Generally inhabit salt marshes and Estuary; crawling on damp mud bank and on the roots of the mangrove trees.

108. ***Pythia plicata*** (Ferussac) Gray, 1825
(Plate XVI. E)

1825. *Scarabus Plicatus* (Feussac) Gray, *Ann. Phil.*, **25** : 415

2003. *Pythia plicata* : Subba Rao, *Rec. zool. Surv. India, Occ. Paper No.*, **192** : 371, Pl. 95, fig. 7.

Material examined : 1 ex. 02. iv. 2007, Kirtania, A. Misra & S. Mitra; 2 ex. 13.x. 2007, Kirtania, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 10-24, D = 8-25; Shell small, ovate, compressed; spire acute; whorls compressed with varix on either side; outer lip thin and dentate internally (six teeth); columella plicated; sculptured with longitudinal growth striae; light purple in colour with a white band along the outer lip.

Habitat : Muddy littoral area and in the scanty zone of the mangroves.

Distribution : India : Orissa : Subarnarekha estuary, False Point (Paradeep) Mahanadi Esturay; Andhra Pradesh : Godavari; Pondichary; Tamil Nadu : Chennai, Portonovo; West Bengal : Hugli-Matla Estuary, Port Canning, Sunderban.

Elsewhere : Srilanka; Myanmar; Borneo; Java; Siam; Honkong.

Remarks : Generally occur in moist places. Found under stones, dead leaves and holes in rotten tree trunks; after shower they are seen crawling actively in the night.

Class **BIVALVIA**

Subclass **PTERIOMORPHIA**

Order **ARCOIDA**

Family **ARCIDAE**

109. ***Anadara granosa*** (Linnaeus, 1758)
(Plate XVI. F)

1758. *Arca granosa* Linnaeus, *Syst. Nat. ed.* **10** : 694.

1992. *Anadara granosa*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 218-219, pl. 15. fig. 3.

Material examined : 8 ex. 14.x.2007, Kirtania, A. Misra & S. Mitra; 3 ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 12-84, Ht = 9-68; Shell thick, equivalved, heavily sculptured with regular ribs; Ventral margin crenulated; Keel on posterior part absent.

Habitat : Muddy intertidal area of Subarnarekha mouth.

Distribution : India : Andhra Prasesh : Godavari Estuary, Kakinada; Gujarat; Kerala; matabar Coast; Maharashtra : Bomba; Orissa : Chandipur Mahanadi Estuary, Chilika lagoon, Puri Coast; Tamil Nadu : Ennur Bank Waters, Tranquebar and West Bengal : Hugli Matla estuary, Medinipur, North and South 24 Parganas.

Elsewhere : Indo Pacific.

Remarks : Common name is Ark Shell. Generally found buried in soft mud in Estuary and back waters. Shell is used in lime industry.

110. *Scapharca deyrollei* Jousseaume, 1893

(Plate XVII. A)

1893. *Scapharca deyrollei* Jousseaume, *Le Naturaliste*, 15 lanne, p. 191.

1992. *Scapharca deyrollei*: Subba Rao, et al., *Fauna of Orissa, State Fauna Series, 1(Part-3)* : 104.

Material examined : 13 ex. 14.x.2007, Kirtania, A. Misra & S. Mitra

Diagnosis : Measurement : L = 18-44, Ht = 11-37; Elongated inequivalves; umbo more elevated; cardinal area narrow; dorsal surface of valve angulated and radiately ribbed (ribs 33 to 35 nos.)

Habitat : Muddy intertidal area of Subarnarekha mouth.

Distribution : India : Andhra Pradesh : Godavari Estuary; Orissa : Mahanadi Estuary, Chandipur, Puri Coast, Chatrapur; Maharashtra : Bombay, Alibag, Ratnagiri, Tamil Nadu : Madras, Coromandal Coast; West Bengal : Sand Heads, Medinipur.

Elsewhere : Sri Lanka; Myanmar : Tavoy; Malaysia : Penang; Indonesia : Sumatra, Java and China sea.

Remarks : Can be differentiated from *Scapharca inaequivalves* by its elongate shell and oblique keel.

111. *Scapharca inaequivalvis* (Bruguiere, 1789)

1789. *Arca inaequivalvis* Brugiere, *Ency. Meth. Vers.* 1, 106, pl. 305, fig. 3a.

1992. *Scapharea inaequivalvis* : Subba Rao, et al., *Fauna of West Bengal, State Fauna Series, 3(Part-9)* 219, pl. 15. figs. 6 and 7.

Material examined : 2 ex, 05.vii.2006, Talsari, A. Misra & S. Mitra; 6 ex. 06.iv.2007, Talsari., A. Misra & S. Mitra.

Diagnosis : Measurement: L = 19-16, Ht = 15-32; Shell rhomboidal/elongately ovate, inequivalve; umbo elevated cardinal area not so narrow; side angulated at the dorsal margin; shell surface sculptured with flay radial ribs and more than thirty, in number.

Habitat : Muddy intertidal area of Subarnarekha mouth.

Distribution : India : Andhra Pradesh : Godavari Estuary; Goa; Gujrat : Pirotan Island in Gulf of Kutch; Kerala : Cochin; Maharashtra : Bombay : Orissa Mahanadi Estuary, False Point, Konark Coast, Ganjam Coast; Tamil Nadu : Madras, Krusdai, Kundugal Point, Tranquebar, West Bengal : Medinipur, South 24 Parganas.

Elsewhere : Myanmar : Mergui-Archipelago; China; Indonesia; Japan; Philippines and Persian Gulf.

Remarks : Widely distributed in the Indo-Pacific region.

Order MYTILOIDA

Family MYTILIDAE

112. *Perna viridis* (Linnaeus, 1758)

(Plate XVII. B & C)

1758. *Mytilus viridis* Linnaeus, *Syst. Nat. ed.* 10 : 106, sp. No. 2201992. *Perna viridis*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 219, pl. 15. figs. 6 and 7.**Material examined** : 4 ex. 06.iv.2007, Talsari, A. Misra & S. Mitra.**Diagnosis** : Measurement : L = 8 Ht = 13; Shell elongately triangular; Umbo situated on the anterior end. Posterior end pointed; Periostracum greenish black.**Habitat** : Rocks and boulders in intertidal area of Subarnarekha mouth.**Distribution** : India : Andhra Pradesh : Visakapatnam, Bhimilipatnam, Kakinada; Gujarat : Gulf of Kutch; Goa; Kerala : Cochin, Allepy; Maharashtra : Malvan, Rantagiri, Bombay; Orissa : Mahanadi Estuary, Chandipur, Chilika Lagoon (manikapatna), Chatrapur, Goppalapur, Sunupur; Pondichary; Tamil Nadu : Madras, Pamban, Porto Novo; West Bengal : Medinipur.**Elsewhere** : From Hong Kong to Arabian sea**Remarks** : Commonly known as green mussel, occurs in clusters.113. *Modiolus tulipa* (Lamarck, 1836)

(Plate XVII. D)

1836. *Modiola tulipa* Lamarck, *Hist. Nat. Anim. Sans. Vert.*, 7 : 18.1992. *Modiolus tulipa*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 221-222, pl. 16. figs. 3 and 6.**Material examined** : 2 ex. 13.x. 2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Shell thick, glossy, brown, moderately large, lower margin concave in the middle and upper margin convex,; sculptured with fine concentric striae, a prominent oblique keel extending from umbo along the middle; inner side with distinct bluish white outer part and purplish inner part; dorsal half above the keel with hairy surface.**Habitat** : Found on the concrete jetty at Kirtania.**Distribution** : India: Orissa, West Bengal, Tamil Nadu and Andaman and Nicobar Islands.**Elsewhere** : Mauritius.**Remarks** : This species is not common as other Mytelligs found in this estuary.

114. *Modiolus striatulus* Hanley, 1844

(Plate XVII. E)

1844. *Modiolus striatula* Hanley, *Proc. Zool. Soc. Lond.*, 1844. pt. 7 : 14.1992. *Modiolus striatulus* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 221, Pl. 16, figs. 2 and 4.**Material examined** : 2 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 5 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : L = 6 Ht = 12; Shell strongly trapezoid and gibbous in the middle; surface with radial striations which are wider and more distinct on the anterior margin.**Habitat** : Rocks and wooden pillars and on the roots of mangrove plants.**Distribution** : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Chilika Lagoon; Andaman and Nicobar islands; Kerala : Cochin; Maharashtra : Bombay); Tamil Nadu : Ennur back waters. Nr. Chennai; West Bengal: Port Canning, Hugli Matla Estuary, Kiderpore Docks, Kolkata, Howrah, North and South 24 Parganas.**Elsewhere** : Sri Lanka; Myanmar; Singapur; Gulf of Thailand; Philippines; China and Japan.**Remarks** : Usually found attached to stones, wooden jetties in submerged waters and on algal mass on stone.

Order OSTREOIDA

Family OSTREIDAE

115. *Crassostrea gryphoides* (Schlotheim, 1813)1813. *Ostrea gryphoides* Schlotheim, *Beitr. Natur. Verstein geogn. Hinsicht.*, 7 : 52.1971. *Crassostrea gryphoides*: Ahmed, *Pakist. J. Zool.*, 3(2) : 232, pl. II, figs. 10-12, 16.1992. *Crassostrea gryphoides*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 225, pl. 18, figs. 3 and 4.**Material examined** : 3 ex. 14.x. 2007, Talsari, A. Misra & S. Mitra.**Diagnosis** : Shell stout, bulky, elongated and irregular shape; inner margin pearly white; cavity beneath the hinge well marked; muscle scar broad and more or less oblong striations on the muscle scar.**Habitat** : Attached with rocks, boulders and wooden pillars and on the stems of mangrove plants submerged within the intertidal area near the estuarine mouth.**Distribution** : Orissa and West Bengal**Elsewhere** : Myanmar.**Remarks** : Its population is less than the *Saccostrea cucullata*.

116. ***Crassostrea cuttakensis*** (Newton and Smith, 1912)

1912. *Ostrea Gryphoides* var. *cuttakensis* Newton and Smith, *Rec. geol. Surv. India*, **42** (I) : 13 pls. 7, 8. figs. A. B.

1992. *Crassostrea cuttakensis* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 224.

Material examined : 1 ex. 16.iii.2008, Talsari, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 21-62; Ht = 28-139; Shell thick, heavy, externally scaly and of variable shapes; inner surface of the valve procellaous and whitish.

Habitat : Attached with rocks, boulders and wooden pillars and on the stems of mangrove plants submerged within the intertidal area near the estuarine mouth

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi Esturay, Chandipur, Kasaphal, Hukitola, Chilika Lagoon (Manikpata), Ganjam Coast (Chatrapur, Gopalpur); Andhra Pradesh : Godavari Estuary, Chitivalsa nr, Visakhapatnam, Karwar; Maharashtra : Bomby; Tamil Nadu : Ennoor Backwater, Pulicate Lake, Krusadai, Single Island; West Bengal : Hugli Matla Estuary, Sunderbans, North 24 Parganas.

Elsewhere : Bangladesh; Myanmar : Mergui Archipelago; Malaysia : Penang; Singapore; Indonesia : Sumatra, Borneo; Vietnam; Philipines and Hong Kong.

Remarks : Under different environmental conditions the shape, size and impression of muscle scars of valve change and creat problem during identification. Occur in most of the easturies and back water along the east coast. Along the West Coast this species if found in more number in southern region only (Kerala). Extensive beds are found in the Mahanadi Estuary in Orissa, Gokulapalli in A.P. and Vembanad Lake in Kerala.

117. ***Saccostrea cucullata*** (Born, 1778)

(Plate XVII. F)

1778. *Ostrea cucullata* Born, *Index Rerum Naturalium musei Casarei Vinod bonesis* : 100.

1992. *Saccostrea cucullata* : Subba Rao, *et at.* *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) :225, Pl. 19. fig. 1.

Material examined : 2 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 5 ex. 02. iv. 2007, Kirtania, A. Misra & S. Mitra; 2ex, 15.x.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 20-47; Ht = 25-59; Shell small (Length not excuding 50 mm); Lower valve with crenulate margin; rows of tubercles present on either side of the umbonal groove.

Habitat : On the jettys and tree trunk of the mangroves, rocky part in the intertidal area.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Paradeep, Gopalpur; Andhra Pradesh : Godavari Estuary, Bhimlipatnam, Visakhapatam; Andaman and Nicobar Island; Gujarat : Gult of Kutch; Kerals : Malabar Coast;

Maharashtra : Bombay; Tamil Nadu : Chennai, Krusadai Island, Shingle Island, Pamban; West Bengal : Hugli Matla Estuary, Port Canning.

Elsewhere : Widely Distributed in Indo Pacific area.

Remarks : Grows in clusters on rock and coral reefs. Usually marine in habitat but also seen on backwaters. Species is highly variable.

Family ANOMIIDAE

118. *Enigmonia aenigmatica* Holten, 1795

(Plate XVIII. A)

1795. *Tellina aenigmatica* Chemnitz, *Conch. Cab.* : 11, pl.199, fig. 199.

1918. *Enigmonia aenigmatica* Iredale, *Proc. Malac. Soc. Lond.*, 13:28.

1998. *Enigmonia aenigmatica*: Subba Rao, et al. *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 224, Pl. 18. fig. 1 & 2.

Material examined : 2 ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra

Diagnosis : Shell thin, fragile, inequivalve, almost rounded, colour purple metallic; right valve far bigger than the left one,; muscle scars well developed; adductor muscle scar single and smaller than the byssal retractor muscle scars, in left valve total number of muscle scar is three.

Habitat : Attached to the trunk of the mangroves and also with the jetties.

Distribution : India : Orissa, West Bengal and Maharashtra.

Elsewhere : Bangladesh, Myanmar, Philippines and Singapore.

119. *Anomia achaeus* Gray, 1839

(Plate XVIII. B)

1839. *Anomia achaeus* Gray, *Proc. Soc. Lond.*, 116

1992. *Anomia achaeus*: Subba Rao, et al., *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 223, Pl 17, fig. 4 and 5.

Material examined : 6 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 28-49; Ht-22-45; Shell irregular in shape, broadly ovate, golden yellow in colour, small (not exceeding 40mm in length); Upper valve more inflated; lower valve with hole, through which byssus thread passes.

Habitat : Observed on the tree trunks of mangroves.

Distribution : India : Subarnarekha Estuary (Orissa); Andhra Pradesh : Godavari Estuary; West Bengal, North and South 24 Parganas; Kerala, Gujarat and Maharashtra.

Elsewhere : Persian gulf, Gulf of Eden; Pakistan coast; Kawa Bay and West coast of Ceram.

Remarks : Some times these shells found attached to oysters and trunk of mangrove plants.

Order VENEROIDA

Family SOLENIDAE

120. *Solen brevis* Gray, 1842

(Plate XVIII. C)

1842. *Solen brevis* Gray, in Hanley's *Recent Bivalves*, p. 12. pl. 13, fig. 42.1992. *Solen brevis* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 230 Pl. 21, figs. 1 and 2.**Material examined** : 2 ex. 06.iv.2007, Talsari, A. Misra & S. Mitra.**Diagnosis** : Measurement : L=27; W=5; Shell straight; posterior end flattened and tapering; anterior margin broad and truncated but posterior margin narrow; presence of prominent growth lines.**Habitat** : Mid to lower littoral area of sandy zone.**Distribution** : India : Orissa; Tamil Nadu and West Bengal

Family CULTELLIDAE

121. *Pharella javanicus* (Lamarck, 1818)1818. *Solen Javanicus* Lamarck, *Hist. Nat Anim. Sans. Vert.*, 5 : 4541992. *Pharella javanicus* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 231, Pl. 21, figs. 6 and 7.**Material examined** : 3ex. 02. iv. 2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : Ht=11-15; L=44-60; Shell subcylindrical large (exceeding 30 mm in length), thick, covered by periostracum; both posterior and anterior ends rounded; absence of deep furrow on anterior margin; hinge with more than one tooth; posterior side oblique, broad and curved.**Distribution** : India : Orissa and West Bengal.**Elsewhere** : Malaysia : Penang; Singapore; Indonesia : Java; Philippines : Cuba.**Remarks** : Generally found in upper mud flats where the substratum is hard; burrowing forms and can be recognized by their slit-shaped holes.122. *Siliqua radiata* (Linnaeus, 1758)

(Plate XVIII. D)

1758. *Solen radiata* Linnaeus, *Syst. Nat. ed.* 10, P. 673, No. 28.1992. *Siliqua radiata*: Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 232, Pl. 21, figs. 8 and 9.**Material examined** : 4 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 1 ex. 01. iv. 2007, Talsari, A. Misra & S. Mitra.; 2 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra.**Diagnosis** : L=34 Ht=16; Shell oblong with four radiation bands ; dorsal margin straight; rounded ventral and dorsal margin; Presence of internal ridge towards interior part; Pallial sinus wide and deep.

Habitat : Sandy intertidal shore.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Cuttack Coast, Puri Coast (Konark) mouth Area of Chilika Lagoon (Stpada); Andhra Pradesh L Visakhapatnam, Kakinada; Goa; Gujarat : Gulf of Kutch; Kerala : Malabar Coast; Maharashtra : Bombay; Tamil Nadu : Chennai, Pamban, Tiruchendur, Tranquebar.

Elsewhere : South Africa : Durban; Sri Lanka; Myanmar; Indonesia : Sumatra, Java, Celebes Moluccas; Common in Shallow muddy area in the Indian Ocean (Abbott and Dance, 1982).

Remarks : Commonly known as 'Sunset' shells. Generally dead shells are found washed on sandy shores.

123. *Siliqua albida* Dunker, 1861

1861. *Siliqua albida* Dunker, *Proc. Zool. Soc. Lond.*, p. 423

1992. *Siliqua albida*: Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 232-233.

Material examined : 7 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 3ex. 02. iv. 2007, Kirtania, A. Misra & S. Mitra.

Diagnosis : Shell small, subelliptical, semipellucid, anterior margin short; posterior side oblong; dorsal margin convex; ventral margin scarcely contracted at the middle; sculptured with very fine concentric striae; colour whitish.

Habitat : Found in the littoral area where a small water pool are created during low tide.

Distribution : India: Orissa, West Bengal and Maharashtra.

Elsewhere : Bangladesh and Philippines.

Family TELLINIDAE

124. *Strigilla splendida* (Anton, 1833)

1833. *Tellina splendida* Anton, *verz., Conch*, p. 5.

1908. *Strigilla denestriata* Preston, *Rec. Indian Mus.*, 2 : 210

1992. *Strigilla splendida*: Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 235-236. pl.22. figs. 1& 3.

Material examined : 3 ex. 06.iv.2007, Talsari, A. Misra & S. Mitra; 1 ex. 16. iii. 2008, Talsari, A. Misra & S. Mitra.

Diagnosis : Shell orbicular; sculptured with oblique scissulations on the posterior part of the both valves, anterior ends of valves with fine close concentric striae; shells are variable in colour, rosy, yellowish and white.

Habitat : Lower and sub littoral area along the estuary.

Distribution : India : Orissa, West Bengal and Andaman & Nicobar Islands.

125. *Macoma birmanica* (Philippi, 1849)

(Plate XVIII. E)

1849. *Tellina birmanica* Philippi, *Abbil. Besch.*, **3** : 27, 55 no. 1.1992. *Macoma birmanica* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 236, pl. 22 fig. 6 & 7.**Material examined** : 3 ex. 05.vii.2006, Talsari, A. Misra & S. Mitra; 5 ex. 01. iv. 2007, Talsari, A. Misra & S. Mitra.**Diagnosis** : Ht =19-72; L = 16-78; Shell elongately oval; inequivalve; pallial sinus large occupying entire shell and reaching anterior scar; hinge with only cardinal teeth; Presence of growth lines and concentric striae.**Distribution** : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Beleswar Coast, Andhra Pradesh : Godavari Estuary, Kakinada Bay; West Bengal : Digha, Chemaguri nr. Sagar Island.**Elsewhere** : Myanmar.**Remarks** : Occurs buried in the loose muddy substratum at depths twice that of shell length (some times remain in deeper burrows). Siphons are long and golden yellow in colour in live condition.126. *Apolymetis edentula* Spengler, 1782

(Plate XVIII. F)

1782. *Tellina angulata* Chemnitz, *Conch. Cab.*, **6** : 89. pl. 9, figs. 74-75.1794. *Tellina edentula* Spengler, *Nat. Selsk. Ser.*, **4** : 96.1992. *Apolymetis edentula*: Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 237. pl. 22. fig. 5, pl. 23, fig. 1.**Material examined** : 9 ex. 06.iv.2007, Talsari., A. Misra & S. Mitra.**Diagnosis** : Shell large to medium, somewhat oval, strong, inequivalve, the right one large and convex than the left; cardinal complex consists of bilobed anterior and inflated posterior in the left valve, while laminated anterior and bilobed posterior in right valve; sculptured with concentric striae.**Habitat** : Muddy intertidal (Lower littoral) zone.**Distribution** : India : Widely distributed along the east and west coast of India.**Elsewhere** : Red Sea, Madagascar, Sri Lanka, Thailand, Indonesia, Philippines, New Calidonia and Fiji.

Family CORBICULIDAE

127. *Polymesoda bengalensis* (Lamarck, 1818)1818. *Cyrena bengalesis* Lamarck, *Hist. nat. Anim. Sans. Vert.*, **5** : 564.1992. *Polymesoda bengalensis*: Subba Rao *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 240-241.pl. 24. fig. 5 & 7.

Material examined : 4 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra

Daignosis: Shell large, solid, subtrigonal, roughly straight, dorsal margin rather angulate; posterior margin abruptly sloping; anterior rather concave.

Habitat : Buried in the mud in the side of the small tributaries.

Distribution : India : Orissa, West Bengal and Andaman and Nicobar Islands.

Family VENERIDAE

128. *Meretrix meretrix* (Linnaeus, 1758)

(Plate XIX. A)

1758. *Venus meretrix* Linnaeus, *Syst., ed.*, **10** : 686, sp. 102

1992. *Meretrix meretrix*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, **3**(Part-9) : 242, Pl. 25, figs. 1 and 2.

Material examined : 6 ex. 19.iii.2008, Talsari, A. Misra & S. Mitra.

Diagnosis : L = 16-75; Ht = 14-68; Surface of the shell smooth; pallial sinus shallow; hinge narrow; length of the shell is greater than height; Posterior end with dark band.

Habitat : Lower littoral area of muddy zone of the estuarine mouth.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Mahanadi Estuary, Paradip, Puri Coast, Chilika Lagoon ; Andhra Pradesh : Godavari Estuary; Andaman and Nicobae Ishlands. Goa; Gujarat; Kerala; Maharashtra; Pondichery; Tamil Nadu; West Bengal : Hugli Matla Estuary Mednipur, North and South 24 Parganas.

Elsewhere : Red Sea; Aden; Sri Lanka; Siam; Java; Sumatra : Borneo; Philippines; Chiba; Japan and Mynamar.

Remarks : Commonly occurs in estuaries and back waters on both the coasts of India Highly variable in its shape and colouration for which there are description of several varities *viz.* Morphina, Impudica, Zonaria, Castanea and Aurora. It can be disringuished from *M. casta* by its vantricose shape, more compressed, narrow hinge and very distinct anterior cardinal teeth on left valve.

129. *Meretrix casta* (Gmelin, 1791)

1791. *Venus casta* Gmelin, *Syst. Nat., ed.* **13** : 3278., sp. 42 (refers to Chenminiz, 1782.

1991. *Meretrix casta* : Subba Rao, *et al.*, *Fauna of Orissa, State Fauna Series*, **1**(Part-3) : 149, pl. 27. figs. 1 & 2.

Material examined : 5 ex. 20.iii.2008, Udaypur; A. Misra & S. Mitra.

Diagnosis : L = 22-41; Ht = 19-37; Valves thick, more inflated; hinge broad; Posterior end without band. Lateral teeth on left valve and corresponding grove in right valve finely denticulate, pallial sinus shallow.

Habitat : Lower littoral area of muddy zone of the estuarine mouth.

Distribution : India : Occurs in both the coasts of India and in backwaters with connecting canals.

Elsewhere : Myanmar : Arakan; Malaysia; Malacca; Singapore and Sri Lanka.

Remarks : Variable in its shape, colouration and thickness.

130. *Pelecycora trigona* (Reeve, 1850)

1850. *Artemis trigona* Reeve, *Conch. Icon.*, : 6 pl. 7, fig. 42.

1992. *Pelecycora trigona*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 244, pl. 25, figs. 5 and 6.

Material examined : 3ex. 12.x.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : L = 17; Ht = 17; Shell white or rust Brown in colour, thick and triangularly ovate shaped; umbo curved; sculptured with concentric striae, Ligament small; lunule large and superficial.

Habitat : Lower littoral area of muddy zone of the estuarine mouth.

Distribution : India : Orissa : Baleswar, Chandipur, Chatrapur (Ganjam Coast); Tamil Nadu : Pamban; West Bengal : Digha-Medinipur, North 24 Oorganas and Kerala : Cochin.

Remarks : Generally found in the muddy canals/creeks. This species differs from *P. excisa* in having more inflated form and less excavated ligamental area.

131. *Paphia textilis* (Gmelin, 1791)

(Plate XIX. B)

1791. *Vanue textrix* Gmelin, *Syst. Ed.* 13 : p. 3280

2000. *Paphia textrix* : Subba Rao and Dey, *Rec. zool. Surv. India, Occ. Paper No.*, 187 : 283.

Material examined : 1ex. 12.x.2007, Talsari, Kirtania, A. Misra & S. Mitra; 9 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra

Diagnosis : L = 37, Ht = 22; shell ovate; Surface smooth except with faint reticulations (wavy violet gray lines) ; Posterior end attenuated.

Habitat : Lower littoral area of muddy zone of the estuarine mouth.

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi estuary; Goa and West Bengal : Medinipur, South 24 Parganas.

Elsewhere : Red Sea and Siboga.

Remarks : Synonym : *P. textile*.

132. *Timoclea (Glycodonta) imbricata* (Sowerby, 1853)

1853. *Venu imbricata* Sowerby, *Thes. Cnch.*, pt. 2 : 715, pl 156

1992. *Timoclea (Glycodonta) imbricata*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 246, Pl. 26, figs. 3 & 6.

Material examined : 12 ex, 05.vii.2006, Talsari, A. Misra & S. Mitra; 8 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra.

Diagnosis : L = 37, Ht = 22; Shell triangularly ovate, whitish in colour; Posterior region angulate; palial sinus deep 'V' shaped; radial ribs strong and concentric ribs thin, crested.

Habitat : Sandy lower littoral area of of the estuarine mouth.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Cuttack Coast Puri Coast (Chandrabhaga); Mahanadi Estuary, Ganjam Coast (Chatrapur, Gopalpur); Goa; Kerala : Cochin; Karnataka : Mangalore; Maharashtra; Tamilnadu : Madras, Krusadai Island, Tranquebar, Poprto Navo; West Bengal : Digha Midinipur.

Elsewhere : Sri Lanka; China; Pakisthan.

Remarks : This species were found to form a bed at the lower littoral zone of Talsari and Udaypur sandy intertidal zone.

Family MACTRIDAE

133. *Mactra (Cocelomacra) violacea* Gmelin, 1791

(Plate XIX. C)

1791. *Mactra violecea* Gmelin, *Syst. Nat., ed. 13* : 3260

1992. *Mactra (Cocelomacra) violacea* : Subba Rao, et al., *Fauna of West Bengal, State Fauna Series, 3(Part-9)* : 229, pl. 20 fig. 1 and 3.

Material examined : 4 ex, 05.vii.2006, Talsari, A. Misra & S. Mitra

Diagnosis : L = 40-66; Ht = 30-50; Shell inequilateral, large, deep violet in colour; valves thin; umbo prominent, and less inflated; broad and rounded anterior and posterior margin; presence of fine striae and growth lines.

Habitat : Lower littoral area of muddy zone of the estuarine mouth.

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Chandipur, Chandbali; Andaman Islands; Tamil Nadu : Pamban, Cormandal Coast and West Bengal : Medinipur, South 24 Parganas.

Elsewhere : Indian Ocean to Philipines (Abbott and Dance 1982).

Remarks : Generally found in fine muddy sands in intertidal region. Transversely ovate and thinner shell and violet colouration differs it from the other species of the same genus.

134. *Mactra (Mactrinula) luzonica* Deshayes, 1854

(Plate XIX. D)

1854. *Mactra luzonica* Deshayes, *Proc. Zool. Soc. Lond., p.64. No. 12.*

1992. *Mactra (Mactrinula) luzonica*: Subba Rao, et al., *Fauna of West Bengal, State Fauna Series, 3(Part-9)* : 228, pl. 19, figs. 7 and 8.

Material examined : 7ex. 17. iii. 2008, Kirtania, A. Misra & S. Mitra; 2 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra ; 5 ex, 15.x.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : L = 36; Ht = 27; Shell transversely triangular, equilateral straw coloured; Interior white with deep violet in umbonal region.

Habitat : Lower littoral area of sandy and muddy zone of the estuarine mouth.

Distribution : India : Orissa, West Bengal, Tamil Nadu, Goa, Maharashtra and Andaman and Nicobar Islands.

Elsewhere : Australia; Quensland; Myanmar; Philippines; Sri Lanka and Japan.

Remarks : Widely distributed in tropical and Subtropical waters; usually occur in sandy mud in shallow water.

Family PSAMMOBIIDAE

135. *Sanguinolaria (Soletellina) acuminata* (Deshayes, 1857)
(Plate XIX. E)

1857. *Soletellina acuminata* Deshayes, in *Reeve's conch. Icon.*, 10; *Soletellina*, sp. 12, pl. 3. fig. 12.

1992. *Sanguinolaria (Soletellina) acuminata* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 239, pl. 23, figs. 2 and 4.

Material examined : 5 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra; 3 ex, 15.x.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : Measurement : L = 44-67; Ht = 20-29; Shell much compressed, bluish purple in colour; muscle scars well developed, anterior end rounded whereas posterior end acuminate with obtuse angle; gap on posterior end broad; posterior end narrower than anterior.

Habitat : Lower littoral sandy beaches at Talsari and Udaypur.

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Chandipur, Puri Coast, Ganjam Coast; Andhra Pradesh : Godavari Estuary; Kerala : Astamudi nr. Travancore; Maharashtra; West Bengal : Hugli Matla Estuary, Digha, Sagar Island, Medinipur, North and South 24 Parganas.

Elsewhere : Pakistan : Karachi; Bangladesh; Sri Lanka; Myanmar; Malasiya : Malacca; Philipines; China and Japan.

Remarks : Animal lives inside burrows upto a depth of 2-3 ft within lower tidal zone.

Family DONACIDAE

136. *Donax (Hecuba) scortum* (Linnaeus, 1758)
(Plate XIX. F)

1758. *Venus scortum* : Linnaeus, *Syst. Nat.*, ed. 10, p 686, No. 103.

1992. *Donax (Hecuba) scortum* : Subba Rao, *et al.* *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 236, pl. 23, figs. 3 and 5.

Material examined : 6 ex. 12.x.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : L = 30; Ht = 20; Shell thick, dirty white in colour; sculptured with concentric and radial ribs; Prominent keel extends from umbo to postero-ventral margin.

Habitat : Lower littoral sandy zone.

Distribution : India : Orissa : Subarnarekha estuary, Mahanadi Estuary, Chandipur, Puri Coast, Ganjam Coast; Andhra Pradesh : Visakhapatnam, Godavari Estuary; Goa; Gujarat : Gulf of Kutch; Karanataka; Kerala : malabar Coast; Maharashtra : Bombay; : Pondichery; Tamilnadu : Chennai : Shingle Island, Kundugal Point; West Bengal : Madinipur, Digha.

Elsewhere : South Africa; Persian Gulf; Pakisthan; Sri Lanka; Myanmar; Indonesis and China.

Remarks : Commonly Known as “wedge clam”, burrows in sandy and muddy substratum in shallow water.

137. *Donax (Latona) incarnatus* Gmelin, 1791

(Plate XX. A)

1791. *Donax incarnatus*: Gmelin, *Syst. Nat.* ed. 13 : 3265

1992. *Donax (Latona) incarnatus* : Subba Rao, et al., *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 238.

Material examined : 15 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 8 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra.

Diagnosis : L = 15-17; Ht = 13-15; Shell triglobal; presence of fine sculpture except posterior slope; absence of groove on dorsal margin; posterior carination not conspicuous; pallial sinus shallow; ligament short and brown, lunule small and present in both the valves.

Habitat : Middle to lower tidal area sandy beaches.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur; Gujarat : Kuda; Maharashtra : Bombay, Ratnagiri; Pondichary : Karaikala; Tamilnadu : Tranquebar; West Bengal : Medinipur, South 24 Parganas, Digha.

Elsewhere : Madagascar; Myanmar; Indonesie; Malaysis: Malacca; Hong Kong and Japan.

Remarks : It's a polymorphic species. It forms a vast bed in the lower and middle tidal sandy beaches at Talsari to Digha (West Bengal), which are migrate up and down along the intertidal width of the shore in different season.

Family GLAUCONOMIDAE

138. *Glaucanome sculpta* Sowerby, 1894

(Plate XX. B & C)

1894. *Glaucanome sculpta* Sowerby, *Proce. Malac. Soc. Lond.*, 1 : 40

1992. *Glaucanome sculpta* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 246.

Diagnosis : L = 20-39; Ht = 9-16, Shell elongate, thin, brittle, dirty white in colour; covered with green periostracum; surface finely striated; anterior end short posterior end angularly attenuated.

Habitat : Sand mixed mud and hard mud at the upper tidal zone of the estuary mouth.

Distribution : India : Orissa: Subarnarekha estuary, Chandipur, Talasri Mahanadi Estuary; Andhra Pradesh : Godavari Estuary; West Bengal : Hugli Matla Estuary, Sagar Island in Sunderbans, Medinipur, South 24 Parganas.

Elsewhere : Bay of Bengal.

Remarks : It occurs in hard muddy substratum in the Estuary. Adult one generally found partly exposing their bodies above surface level.

Order MYOIDA

Family PHOLADIDAE

139. *Pholas orientalis* (Gmelin, 1791)

1791. *Pholas orientalis* Gmelin, *Syst. Nat. ed.*, 13 : 3216, sp. 7

1992. *Pholas orientalis*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 250, Pl. 28, figs. 5.

Diagnosis : L = 23-93; Ht = 11-28; Umbonal reflection sparate; interior part strong radial ribs; ribs nodose; posterior part with concentric growth lines.

Habitat : Lower littoral sandy zone.

Distribution : India : Orissa: Subarnarekha estuary, Chandipur, Mahanadi Estuary Andhra Pradesh : Godavari Estuary; Kerala : Cochin; Tamil Nadu : Chennai and West Bengal : Digha coast.

Elsewhere : Indo-pacific.

Remarks : The members of the Family Pholadida (*Martesia*, *Pholas*, *Barnea*) popularly known as 'Piddocks' The members of this Family are burrowing forms and burrow into soft and submerged wooden structure, in the sea water causing damage to the jetties.

140. *Martesia fragilis* (Sowerby, 1873)

(Plate XX. E)

1873. *Pholas teredinaeformis* Sowerby in Reeves, *Conch. Lcon.*, 18, pl. 9. fig. 36.

1992. *Martesia fragills*: Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 249, Pl 29, figs 1and 3.

Diagnosis : L = 17; Ht = 10; Shell obliquely divided in the middle with angularly and longitudinally ribbed anterior half; posterior part with concentrically striated towards margin; Presence of one ventral shield and two dorsal shields upon the umbo; one elongated and narrow shield on posterior part.

Habitat : Found to be attached in the wooden pole and mangrove plants as borer.

Distribution : India : Orissa (Subarnarekha estuary); Andaman and Nicobar Islands; Gujarat. Karnataka; Kerala; Maharashtra; Tamil Nadu and West Bengal : Khidirpur Dock, Port Caning.

Elsewhere : Eastern Pacific; Indo-Pacific; West Atlantic.

141. ***Barnea candida*** (Linnaeus, 1758)

(Plate XX. D)

1758. *Pholas candida* Linnaeus, *Syst. Nat.*, : 669

1992. *Barnea candida* : Subba Rao, et., al., *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 250, Pl 28, figs. 2 and 4.

Diagnosis : L = 56; Ht = 21; Shell thin, subventricose in middle and with protoplax; umbonal reflection present; valve without oblique furrow; attenuated posterior part; sculptured with strong concentric ridges but less prominent on the anterior part.

Habitat : Lower littoral sandy zone.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Mahanadi Estuary ; Maharashtra : Bombay; West Bengal : Medinipur, South 24 Parganas, Sundarban, Sagar Island, Digha.

Elsewhere : Atlantic and Indo-pacific.

Remarks : Found in soft mud banks at dept of 15 to 20 cm below the surface.

Family TEREDINIDAE

142. ***Bactronophorus thoracites*** (Gould, 1856)

1856. *Teredo thoracites* Gould, *Proc. Boston. Soc. Nat. Hist.*, 6 : 15.

1970. *Bactronophorus thoracites*: Rajagopal, *Rec. zool. Surv. India*, 62(1 & 2) : 25.

1992. *Bactronophorus thoracites* : Subba Rao, et al., *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 251

Material examined : 7 ex. 13.X.2007, Kirtania, A. Misra & S. Mitra; 4 ex. 17.iii.2008, Kirtania, A. Misra & S. Mitra.

Diagnosis : Pallets non-segmental, consist of calcareous base covered by periostacum, basal portion of blades triangular with a shallow cup form, postulose, dagger like extension. The dorsal portion of the anterior slope of adult with the disc and the posterior lobe appear eroded, internally the auricles form a shelf where the disc overlaps.

Habitat : Upper littoral to mid littoral zone of the mud bank where the mangroves are seen.

Distribution : India : Orissa; Andaman and Nicobar Islands; Andhra Pradesh; Maharashtra; Tamil Nadu and West Bengal.

Elsewhere : Indo-Pacific.

Remarks : Found in trunk of mangroves.

143. *Bankia* sp.

Material examined : 5 ex. 04.vii.2006, Talsari, A. Misra & S. Mitra; 9 ex. 02.iv.2007, Kirtania, A. Misra & S. Mitra.

Diagnosis : Pallets with numerous closely packed segments distinct cone like, cones are not fused, easily separated; periostracal covering extended as border. Margin of the cups on pallet dentate.

Habitat : Upper littoral to mid littoral zone of the mud bank where the mangroves are seen.

Distribution : India : Orissa; Andaman and Nicobar Islands; Andhra Pradesh; Maharashtra; Tamil Nadu; West Bengal and Kerala.

Elsewhere : Indo-Pacific.

Remarks : Found on the trunk of mangroves.

Subclass ANOMALODESMATA

Order PHOLADOMYOIDA

Family LATERNULIDAE

144. *Laternula truncata* (Lamarck, 1818)

(Plate XX. F)

1818. *Anatina truncata* Lamarck, *Hist. nat. Anim. Sans. Vert.*, 5 : 463

1977. *Laternula subrostrata*: Subba Rao, *Newsl. zool. Surv. India*, 3(5) : 301

1992. *Laternula truncata* : Subba Rao, *et al.*, *Fauna of West Bengal, State Fauna Series*, 3(Part-9) : 255, Pl 29, figs. 1& 2.

Material examined : 7 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra; 3 ex. 06.iv.2007, Talsari., A. Misra & S. Mitra; 8 ex. 01.iv.2007, Talsari, A. Misra & S. Mitra.

Diagnosis : Shell elongately oblong, thin, white in colour with reddish brown outline, umbo anterior in position, anterior dorsal straight where as posterior dorsal concave, ventral margin almost straight, anterior end rounded with straight square, posterior end with large gap.

Habitat : Hard muddy area of upper littoral zone near Talsari.

Distribution : India : Orissa : Subarnarekha estuary, Chandipur, Mahanadi Estuary; West Bengal : Medinipur, South 24 Parganas, Sundarban.

Elsewhere : Indian ocean Islands, Japan and Philippines

Remarks : Found in hard mud banks with protruding the siphon which are purely camouflaged with mud.

VI. Phylum SIPANCULA

Class PHASCOLOSOMATIDEA

Order PHASCOLOSOMATIFORMES

Family PHASCOLOSOMATIDAE

145. *Phasolosoma arcuatum* (Gray, 1828)

(Plate XXI. A)

1828. *Sipanculus arcuatus* Gray, *Spicilegia Zoologica*, London, Trietel, WurtZ & Co. and W. Wood (1) : 8

1994. *Phascolosoma arcuatum*: Cutler, *The Sipauncula*, Cornell University Press, 176-177.

1999. *Phascolosoma arcuatum* Haldar, *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 9-10.

Material examined : 2 examples, 05. iv. 2007; Talsari, A. Misra & S. Mitra

Diagnosis : Trunk length 39.6mm and 44.8mm long in the two specimens, introvert is slender, partially retracted measured as 46 mm & 63 mm long respectively. Tentacles 10 in number, finger like, arranged in a horse-shoe shaped pattern and placed dorsally to mouth. Hooks are arranged in 50-60 closely set complete rows. Each hooks is dark in colour with sharply bent apex forming an obtuse angle. Circular and longitudinal muscle layers are grouped into bands. Retractor muscles are two pairs originating more or less at the same level but arrangement is totally reverse in this species .i.e., anterior muscles arise behind and ventral to posterior ones Rectum is short and with out caecum. Nephridium is 1/3 as long as trunk and attached to body wall by 2/3 of their length.

Habitat : These animals were found here in hard clayee soil (blakish in colour) at a depth of 25-35 cm from the surface. A bivalve namely *Glouconome sclupta* and one species of brachiopod (*Lingula anatina*) are found in the same habitat. Also some polychaetes occupy this same habitat. A small gastropod, *Assimineia* Sp. are noticed to crawl on the surface soil of this area

Distribution : India : Subarnarekha estuary (Orissa); Hooghly-Matla estuary (West Bengal); Kakinada & Visakhapatnam (Andhra Pradesh) and North Andamans.

Elsewhere : Southern China to Northern Australia, Malaysia, Indonesia and Bangladesh

Remarks : This species was describe by Gray from the material collected from the Indian ocean, no specific locality was mentioned there, however this is an indo west pacific species found in tropical shallow water. It is the first record of this species from Orissa coast.

VII. Phylum ECHIURA

Class ECHIURIDA

Order ECHIUROINEA

Family THALASSEMATIDAE

146. *Anelassorhynchus microrhynchus* (Prashad, 1919)

(Plate XXI. B)

1919. *Thalassema microrhynchus* Prashad, *Rec. Ind. Mus.*, **16** : 339-400, fig. 1.1999. *Anelassorhynchus microrhynchus* Haldar, *Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 3-7.**Material examined** : 4 examples, 05.iv.2007; Talsari, A. Misra & S. Mitra.

Diagnosis : The trunk ranges from 13 to 30 mm long (after full narcotisation). Proboscis varies from 1 to 13 mm in length. In live condition the anterior part of the trunk is somewhat translucent, posterior part each quite opaque. Proboscis is rudimentary, its two lateral margins at the proximal end fused ventrally free and end each truncate. Circumanual region possesses papillae. Ventral hooks are well developed and their free ends are broad and curved. Color of the trunk is grayish white, proboscis cream coloured.

Habitat : Found only in the soft mud of mid littoral zone of Talsari.**Distribution** : Subarnarekha estuary, Chandipore (Orissa) and South 24 Parganas (West Bengal)**Remarks** : The species was described from the estuarine zone of Chandipore by Prasad (1919). This is the second report of this species from coastal orissa.**VIII. Phylum ECHINODERMATA**

Class HOLOTHUROIDEA

Order DENDROCHIROTIDA

Family CUCUMARIIDAE

147. *Thorsonia investigatoris* (Koehler and Vaney, 1908)

(Plate XXI. C)

1908. *Cucumaria investigatoris* Koehler and Vaney, *Echinodermata of the Indian Museum*, Part-IV : **36**1971. *Thorsonia investigatoris*: Clark and Rowe, *Monograph of Shallow-water Indo-west pacific echinoderms*, 1821999. *Thorsonia investigatoris* Sastry, *Echinodermata, Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 448**Material examined** : 1 ex, 07.vii.2006, Kirtania; A. Misra and S. Mitra

Diagnosis : This species has a U-shaped body, size very small, 1.5 to 2 inches, tapering towards both the ends; ten branched dendritic tentacles, stout and short

calcareous ring with the posterior bifurcation of the radial plates composed of small pices ; specules large tables with 4 lobed disc and spire of 2-4 pillars.

Habitat : Lower and middle littoral area of the sandy shore at the mouth of this estuary.

Distribution : Known from the locality at Hooghly river mouth and Digha (West Bengal) only, here it is reported from Subarnarekha Estuary (Orissa), India.

Remarks : Very rare in this area. Endemic to the east coast of India.

Order MOLPADIDA

Family CAUDINIDAE

148. *Acaudina molpadioides* (Semper, 1868)

(Plate XXI. D)

1868. *Haplodactyla molpadioides* Semper, *Reise. Archip. Philip.* 2, *Wissen. Resultate*, 41

1971. *Acaudina molpadioides*: Clark and Rowe, *Monograph of Shallow-water Indo-west pacific echinoderms*, 184 and 207

1999. *Acaudina molpadioides* Sastry, *Echinodermata, Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 448

Material examined : 7 ex, 12.x.2007, Talsari; A. Misra and S. Mitra; 4 ex, 20.iii.2008, Udaypur, A. Misra and S. Mitra.

Diagnosis : Body stout, sausage shaped, tentacles-15, Podia absent, skin Flesh colored, more or less opaque. Specules when present small and oval bodied, with a single perforation.

Habitat : Lower and middle littoral area of the sandy shore at the mouth of this estuary. At Talsari Sea beach it's found as forming a Juveniles bed

Distribution : India : Tamilnadu, Andaman and Nikobar Is. and South 24 parganas and Midnapore District (West Bengal), Subarnarekha Estuary (Orissa)

Elsewhere : Philippines and South China sea.

Remarks : Recently its population is decreasing. Population booming were observed, in 1999 large nountber of Specimen (thousands of) found in mouth of Subarnarekha River (Kirtania) but then next few years its availability is scanty. The specimen is also found in dragnet materials.

Class ASTEROIDEA

Order PAXILLOSIDA

Family ASTROPECTINIDAE

149. *Astropecten indicus* Doederlein, 1872

(Plate XXI. E)

1872. *Astropecten indicus* Doederlin. *Zool. Jb. syst. Bd*, 3 : 828

1999. *Astropecten indicus* Sastry, *Echinodermata, Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 471-472, pl. I. fig. 2-5.

Material examined : 2 ex, 05.vii.2006, Talsari, A. Misra and S. Mitra; 1 ex, 06.iv.2007, Talsari, A. Misra and S. Mitra ; 2 ex, 12.x.2007, Talsari, A. Misra and S. Mitra; 3 ex, 16.x.2007, Udaypur, A. Misra & S. Mitra.

Diagnosis : Usually arms are blunt at the tip, and superomarginal plates without a spine. Actinal plates only two on either side of each interradius. Inferomarginal plates with pointed spinlets on the actinal surface, but it is very variable species in respect of arms and development of Superomarginal Spines.

Habitat : Generally inhabits Sandy Substrate, often found in intertidal Zone. In winter it is quite common in intertidal Zones of sandy beaches of Talsari.

Distribution : India: Bay of Bengal, South 24 parganas and Midnapore District (West Bengal), Subarnarekha Estuary (Orissa), Tamil Nadu, Andhra Pradesh, Kerala.

Remarks : Available in plenty just before 10 years ago, but now a days its become very rare probably due to indiscriminate destruction by fishing gears, like prawn seed net and other anthropogenic activities on sea beach.

150. *Astropecten euryacanthus* Luetken, 1872

1872. *Astropecten euryacanthus* Luetken, *Vidensk Meddr.dansk. naturh. Foren*, **1871** : 231

1999. *Astropecten euryacanthus* Sastry, *Echinodermata, Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 471, pl. I. fig. 6,7.

Material examined : 1 ex, 04.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Usually arms are broad at base and tapering to a pointed tip. Actinal plates only three or more on either side of each interradius. Inferomarginal plates with rounded scale like spinlets on the actinal surface.

Habitat : Generally inhabits Sandy Substrate, often found in intertidal Zone.

Distribution : India : Bay of Bengal, Nikobar and South 24 Parganas and Midnapore District (West Bengal), Subarnarekha Estuary (Orissa).

Remarks : It is very rare in this area.

Class OPHIUROIDEA

Order OPHIURIDA

Family ACTIDAE

151. *Ophiactis modesta* Brock, 1889

(Plate XXI. F)

1889. *Ophiactis modesta* Brock, *Z. weiss. Zool.*, **47** : 482

1999. *Ophiactis modesta* Sastry, *Echinodermata, Fauna of West Bengal, State Fauna Series*, **3**(Part-10) : 477-478.

Material examined : 1 ex, 17.iii.2008, Kirtania; 1 ex, 01.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Disc scales with scattered pointed spinelets. A thick, single, lateral oral Papilla. No inferodental Papilla. Dorsal arm plates broader than long, distal margin Concave in the middle; arm spines five, pointed, uppermost and second longest.

Habitat : Found in the wooden Bloks and decayed mangrove parts impregnated in the muddy Intertidal area at kirtania and Talsari.

Distribution : India: Bay of Bengal, Subarnarekha Estuary (Orissa), Tamilnadu, Andamans and South 24 parganas and Midnapore District (West Bengal),

Elsewhere : Arabian Sea to Hawaii Is.

Remarks : It is rare in this area.

Class ECHINOIDEA

Order TEMNOPLEUROIDA

Family TEMNOPLEURIDAE

152. *Temnopleurus toreumaticus* (Leske, 1778)

(Plate XXII. A)

1778. *Cidaris toreumaticus* Leske, *Add. ad. Klein*, 155

1971. *Temnopleurus toreumaticus*: Clark and Rowe, *Monograph of Shallow-water Indo-west pacific echinoderms*, 142 and 154.

1999. *Temnopleurus toreumaticus* Sastry, *Echinodermata, Fauna of West Bengal, State Fauna Series*, 3(Part-10) : 481, pl. iv, fig. 3.

Material examined : 12 ex, 06.iv.2007, Talsari, A. Misra and S. Mitra.

Diagnosis : Size 2-4 cm in radius and 1.5-2.5 cm in height. Taste plates with deep transverse pits at the corner. Ambulacral plates each with primary tubercles, which is imperforate. Spines banded with reddish grey.

Habitat : Inhabits sandy or mud impregnated sandy substrata. Large aggregations of juvenile specimen were observed near Talsari area at April, 2006.

Distribution : India : Subarnarekha Estuary (Orissa); Gujrat, Maharastra, Andhrapradesh, Tamilnadu, Andaman Island and South 24 parganas and Midnapore District (West Bengal).

Elsewhere : Red Sea and east of Africa to south pacific Islands.

Remarks : Common, but population decreasing in alarming rate.

IX. Phylum **CHORDATA**

Class OSTEICHTHYES

Order ANGUILLIFORMES

Family MORINGUIDAE

153. *Moringua raitaborua* (Hamilton, 1822)

(Plate XXII. B)

1822. *Muraena raitabarua* Hamilton, *Fishes of Ganges* : 25, 364

1878. *Moringua raitaborua*, Day (Partim), *Fishes of India* : 666, Pl. 170. Fig. 3.

1992. *Moringua raitaborua*, Sen, T.K. *Fauna of West Bengal, State Fauna Series*, 3(Part-10) : p. 113, fig. 2.

Material examined : 1 ex, 17.iii.2008, Kirtania, A. Misra & S. Mitra

Diagnosis : Head not conspicuous from the rest of the body, occipital crest not elevated nor prominent; depth of the body 31-45 times in total length, head 8-10 times of total length; colour coppery, olive above; becoming silvery below.

Distribution : India : Gangetic estuary, Mahanadi Estuary, Bangladesh.

Family OPHICHTHIDAE

154. *Ophichthus altipinnis* (Kaup, 1856)

High fin snake-eel

1856. *Microdonophis altipinnis* Kaup, J.J. *catalogue of apodal fish in the collection of the British Museum*, London : British Museum, p. 154.

1990. *Ophichthus altipinnis* MacAlister, D.E. *A working list of fishes of the world* : 251

2002. *Ophichthus altipinnis* Kapoor, D., R. Dayal and A.G. Ponniah, *Fish biodiversity of India* : 61.

Material examined : 1 ex, 12.x.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Color pale brown; pectoral fins dark. A prominent pale spot before eye and a smaller pale spot on snout above anterior nostril. Barbels prominent along ventral margin of upper lip; one beneath the anterior margin of the eye, the other midway between it and the base of the anterior nostril. Dorsal fin elevated its origin just above or slightly in advance of gill openings. Pectoral fins elongate, 2.4-2.8 HL. Tip of the tail finless, head and trunk contributed 1.5 to more times in tail, dorsal fin originated above gill openings.

Habitat : Soft mud at the lower and middle tidal area.

Distribution : Indo-Pacific: considered as very rare in Indian region (Talwar & Kakkar, 1984)

155. *Ophichthus apicalis* (Bennett, 1830)

Bluntnose snake-eel

1830. *Ophichthus apicalis* Bennett, *cat. Zool. Spec.*; In : *Mem. Life of Raffles* : 692.

1984. *Ophichthus apicalis*: Talwar and Kacker, *Comm. Sea. Fish. India* : 246-247.

Material examined : 1 ex, 06.iv.2007, Talsari, A. Misra & S. Mitra

Diagnosis : Body light brown with greenish tint, ventrally pale brownish - yellow, lighter on fins. Dorsal fin originates behind pectoral fin bases, teeth in upper jaw in a single row on sides of jaws. Snout rather blunt. Dorsal and anal fins expanded near end of tail.

Habitat : Soft mud at the lower and middle tidal area.

Distribution : Indo-Pacific: Kenya south to Madagascar and South Africa, and east to Taiwan, Thailand, and the Philippines.

Order PERCIFORMES

Family GOBIIDAE

156. *Boleophthalmus boddarti* (Pallas, 1770)

Boddarts goggle-eyed goby

(Plate XXII. C)

1770. *Gobius boddarti* Pallas, *Spicilegia*, **8** : 11, Pl. 1, figs. 4, 5.1977. *Boleophthalmus boddarti* : Rama Rao, Chakrapany and Chatterjee, *Indian J. Zool.*, **16**(3) : 237.2009. *Boleophthalmus boddarti* Mishra, Fauna of Krishna Estuary, *Estuarine Ecosystem Sereis*, **5** : 273-274.**Material examined** : 1 ex, 02.iv.2007, Kirtania. 2 ex, 05.vii.2006, Talsari, A.Misra & S.Mitra**Diagnosis** : Size about 15-20 Cm. body elongate, height 6-7 in total length, head 5 in total length, eye close together, 6 in head length, snout obtuse not longer than eye. Teeth in upper jaw in front 4-6 canines, first dorsal with 7 rays, second dorsal with 25-27 rays. Color darkish green with 6-7 dark spot or oblique bands. Head with blue or brown spots. First dorsal fins with blue spots.**Habitat** : It's a more terrestrial in habit than other semiaquatic gobiids found in the muddy banks in Talsary and Kirtania and also in the mangroves areas. Most common gobioid fish of the mudflat region of Subarnarekha estuary.**Distribution** : India : All seas and estuaries of India.**Elsewhere** : Thailand, Malaya, Singapore, Sumatra, Java, Borneo, China and New Guinea.157. *Scartelaos histophorus* (Valenciennes, 1837)**Walking goby**1837. *Boleophthalmus histophorus* Valenciennes, *Hist. Nat. poiss.*, **12** : 2101991. *Scartelaos histophorus* Talwar and Jhingran, *Inland fishes*, **2** : 960-961, fig. 278.**Material examined** : 1 ex, 13.x.2008, Kirtania, A. Misra & S.Mitra**Diagnosis** : 10-15 Cm in Size. Free lower eye lid; eyes erectile; mandibular teeth pointed; lower side of head with barbells; scales minute to rudimentary; last rays of dorsal fin connected by membrane to caudal fin; spots and cross bars on body.**Habitat** : It's found in the muddy banks in Talsary and Kirtania and also in the mangrove areas.**Distribution** : India, Bangladesh, Myanmar, throughout the East Indies to Philipines, China and Australia.

158. *Taenioides anguillaris* (Linnaeus, 1758)**Eel worm goby**

(Plate XXII. D)

1758. *Gobius anguillaris* Linnæus, C. *Systema naturae*, Ed-10(1) : 264.1991. *Taenioides anguillaris*: Talwar and Jhingran, *Inland Fishes of India*, 2 : 984.2009. *Taenioides anguillaris* Mishra, Fauna of Krishna Estuary, *Estuarine Ecosystem Sereis*, 5 : 282.**Material examined** : 3 ex, 02.iv.2007, Kirtania, A. Misra & S. Mitra.**Diagnosis** : colour golden yellow dorsally, pale ventrally, Dorsal spines (total) : 6-6; Dorsal soft rays (total) : 40-47; Anal spines : 1; Anal soft rays : 37-44. Depth 13-15, head 6.5-7.5 in SL; barbels 3 pairs; upper jaw with 6 or 7 canines and lower jaw with 4 or 5 canines on each side. Body scaleless.**Distribution** : Indo-Pacific : India, China, Malaysia, Indonesia and Papua New Guinea.**Remarks** : Found in estuaries, shallow coastal waters and rivers.159. *Periophthalmus novemradiatus* (Hamilton-Buchanan, 1822)**Pearse's mudskipper**

(Plate XXII. E)

1822. *Gobius novemradiatus* Hamilton-Buchanan, *Fishes of Ganges* : 43**Material examined** : 2 ex, 05.vii.2006, Talsari, A. Misra & S. Mitra**Diagnosis** : D IX - XI - 13-14; A 12-14; P₁ 11-14; LR 61-76; PDS 20-28. Body moderately elongate, compressed. Head slightly compressed; profile of snout steep; dermal cup-like process developed beneath eye; single row of conical teeth on each jaws. Pelvic fins almost separated; frenum (= membrane uniting pelvic spines) present. Scales on head and body cycloid. No sensory canals and pores on head. Head and body gray brown with indistinct dusky mottles; first dorsal fin with several dusky spots tinged with red, in addition to broad distal submarginal black band.**Distribution** : Eastern Indian Ocean, Andaman Sea and West Pacific.**Remarks** : Found in intertidal zone of mangrove areas.

Family TRYPAUCHENIDE

160. *Trypauchen vagina* (Bloch & Schenider, 1801)**Burrowing goby**1801. *Gobius vagina* Bloch and Schneider, *syst. Ichth.* : 73.1876. *Trypauchen vagina*: Day, *Fishes of India* : 320, pl. 68, fig 2.22009. *Trypauchen vagina* Mishra, Fauna of Krishna Estuary, *Estuarine Ecosystem Sereis*, 5 : 283.

Material examined : 3ex, 02.iv.2007, Kirtania, A. Misra & S. Mitra

Diagnosis : Pinkish red in colour, eyes minute, mouth oblique, teeth in several rows pointed, outer row enlarged and caninoid, dorsal fin continuous; dorsal and anal fin confluent with caudal fins.

Distribution : Hugli Matla estuary, Andaman and Nicobar Island and Goa.

Elsewhere : Indo-Pacific.

X. Class REPTILIA

Order SQUAMATA

Family NATRICIDAE

161. *Xenochrophis piscator* (Schneider, 1799)

1799. *Hydrus piscator* Schneider, *Hist. Amp.*, I : 247

1940. *Xenochrophis piscator*, Whitaker, *Common Indian Snakes*, p. 22.

Material examined : Observed few specimen on the mudflat of Kirtania and Pantei.

Diagnosis : Dorsal body colour black and yellow spot on the yellow surface as a pattern of typical chessboard like, Ventral side white.

Distribution : Coastal and tidal rivers of Indo-Chinese region; Sri Lanka and Malay Peninsula

Family HOMALOPSIDAE

162. *Cerberus rhynchops* (Schneider, 1799)

(Plate XXII. F)

1799. *Hydrus rhynchops* Schneider, *Hist. Amp. I.*, 246

1943. *Cerberus rhynchops*, Smith, *Fauna Brit. India, Rept. Amph.*, III, Serpents, pp. 393

Material examined : Observed in good number on the mudflat of Kirtania and Talsari.

Diagnosis : Back grey with numerous cross-bars, a black streak on the side of the head passed through the eyes and on to the neck.

Distribution : India, Pakistan, Bangladesh, Myanmar and China.

RESULTS AND DISCUSSION

As a result of our study a total 162 species of intertidal macrofauna (invertebrates and vertebrates) belongs to 119 genera and 80 families were identified from this estuary. Major faunal group present in this estuary is as follows; Cnidarians comprises with 6 species 6 genera 6 families; Annelids with 26 species 17 genera 11 families; Arthropods as 29 species 15 genera 7 families, Molluscs as 82 species, 64 genera and 42 families; Echiurids, Sipunculids and Brachiopods represent as a single species;

Echinoderms 6 species 5 genera 5 families; Among the vertebrates Fishes represent as 8 species belongs to 7 genus and 4 families, where as Intertidal snakes were found here only 2 species, 2 genera and two families.

A total 8 Phylum of invertebrates have been counted, where as vertebrate Intertidal fauna composed of only 2 classes (Fishes and reptilia). Among this groups phylum mollusca is dominated (50.61 %) with a list of 82 species, crustaceans and polychaetes following the second and third major group, where phylum- Sipanacula, Echiura and Brachiopoda represented here with a single species only. Phylum mollusca represented in this estuary by 82 species of which gastropod comprises the major portion by 46 species where as pelecypoda or bivalvia consist only 36 species

Cnidarian fauna, which revealed only 6 species under 6 genera 6 families, 4 species are categorized as sea anemone and 1 species are sea pen and a single species as sea pansy. Out of these species only the giant sea anemone, *Paracondylactis indicus* are inhabit in the pure sandy intertidal area of this estuary where as other 5 species were found only in the mud or sandy mud area.

Phylum annelida mostly represented here by class polychaeta, only one species of oligochaetes are represented here namely *Pontodrilus littoralis*. Polychaetes form a major component among the benthic invertebrates of the Estuaries, brakishwaters and lagoons along with crustaceans and molluscs. The nutrient rich estuarine waters and its bottom sediments formed by sand ank clay mixture with a high organic matters, provides an ideal habitat for a large number of polychaetes. Further the mangrove vegetation along the side of the criss-cross channels of the river mouth before joining the sea also facilitates Polychaete population to colonize around the mangrove stems and roots, both living and dead along with several other invertebrates. The variety and abundance of polychaete species present can often be used as an indication of the status of the environment in which they live (Bio-indicator).

Detail study of the Polychaete fauna of the Indian estuaries along the East coast has been done by several authors, Hugli-Matla estuary (Misra *et al.*, 1983, 1985, 1989); Godavari estuary (Srinivas Rao and Rama Sharma, 1979 & 1982); Vellar estuary (Srikrishnadhas *et al.*, 1987) and Mahanadi estuary (C.A.N. Rao, 1998).

Studies on the Polychaeteous annelids of Subarnarekha Estuary based on the material collected by authors led to the identification of 25 species belongs to 15 genera and 9 families. This is nearly 27 % of the total Polychaete fauna of the marine and estuarine habitats of Orissa coast. 5 species of polychaetes are recorded for the first time from the coast of Orissa.

A total 43 species of crustaceans are recorded from this estuary, belongs to 23 genera and 16 families. Majority of them comprises 33 species, which belongs to infra-order- Brachyura. Family portunidae dominated with 8 species. A total 20 species of brachyuran crabs belongs to 10 genera 3 families were recorded from the sandy and muddy substratum of the Intertidal area of this estuary, of which Family Ocypodidae dominated with 10 species, Family Grapsidae consists with 8 species. *Metaplox* is the largest genus with 4 species of this Intertidal area. Estuarine crustacean fauna are

reported from the east coast (Bairagi, 1995; Bhadra, 1995, 1998) but there is no report from this estuary. During the survey of Intertidal macro-fauna at Subarnarekha estuary the authors collected many examples of hermit crabs or anomuran crabs from different parts of this estuary. The present work reveals 6 species of anomuran crabs belonging to 3 genera under 2 families. The systematic status, diagnosis, colour and distribution of those species have been discussed here. Comments on their habitat and shell choice are also stated here as these species are very much dependent on the gastropod shell. Out of these 6 species *Clibanarius padavensis* is most common hermit crab in the muddy area of the estuary, whereas *Diogenes Planimanus* observed in the sandy beaches of Talsari and Udaypur area. *Coenobita cavipes* has a tendency to climb up on the mangroves and they also found in the supra littoral area of entire estuarine system particularly the mangrove area.

Phylum Sipuncula comprises sedentary invertebrates dwelling in burrowed substrata. Though these animals have typically marine origin but some of them are well adapted themselves to the estuarine environments. Indian sipunculans are elaborately studied by Haldar (1989, 1995), *Phascolosoma arcuatum* (Gray) was previously reported from the coast West Bengal and Andhra Pradesh from India.

During faunistic survey at Subarnarekha estuary (Balasore, Orissa) the present authors came across only two specimens of Sipuncula belongs to 1 sp.1 genus 1 Family, specimens identified as *Phascolosoma arcuatum* (Gray) from the hard black muddy soil of Talsari (the western most part of the estuary mouth), and till today there is no report of the occurrence of this species from the coastal Orissa. So, it is the first locality record of this species from Subarnarekha estuary as well as Orissa coast. The occurrences of this species emphasize the faunal richness of this estuary as well as elucidate the wide distributional range of this species in eastern coast of India.

During the study period the authors came across a few specimens of echiura which after carefully investigation, reveals a single species, *Anelassorhynchus microrhynchus* (Prashad) 1919). Though this species are seems to be rare in this area.

62 examples of Echinoderms were collected during this survey which are revealed as 6 species belongs to 5 genera and 5 families. A total of 6 species of Echinoderms are recorded from this coastal area, both marines and brakish water Zone. Just a decade ago most of these species was common but recently only a few namely, Sea star, *Astropecten Indicus* and sea cucumber *Acaudina molpadioedes* are found as common but others are very rare in this area now. An endemic Sea cucumber namely *Thoro Sonia investigatoris* which were only reported from the type locality, now it is find here as second locality record of this species. Sea-urchin, *Ternopleurus toreumaticus* are found in the lower tidal area of this estuarine belt, where brittle Star *Ophiactis Modesta* may found inside the wooden blocks of intertidal Zones.

The Intertidal Fauna of Digha coast was studied by Rao & Misra (1984) comprises only 44 species of Macrofauna. Obviously due to occurrence of a variety type of habitat the faunal composition of Subarnarekha estuary is being so diversified. Fauna associated with mudflat & Mangrove area are totally absent in Digha beach. Due to excessive tourism pressure some animals shifted their population from Digha beach

to Talsari sea beach, of which *Ocypode macrocera*, *Thorosonia investigatoris*, are remarkable.

Status of the specimens of Intertidal macro-fauna also estimated, and 46.91% species are accounted as common in this estuary, where 20.98% species are considered as abundant in this area. A total 28.39% species are rare in this locality. Some species are commercially exploited (19%) in large scale. Due to Anthropogenic activity, habitat loss and some other causes some species (14%) are threatened here.

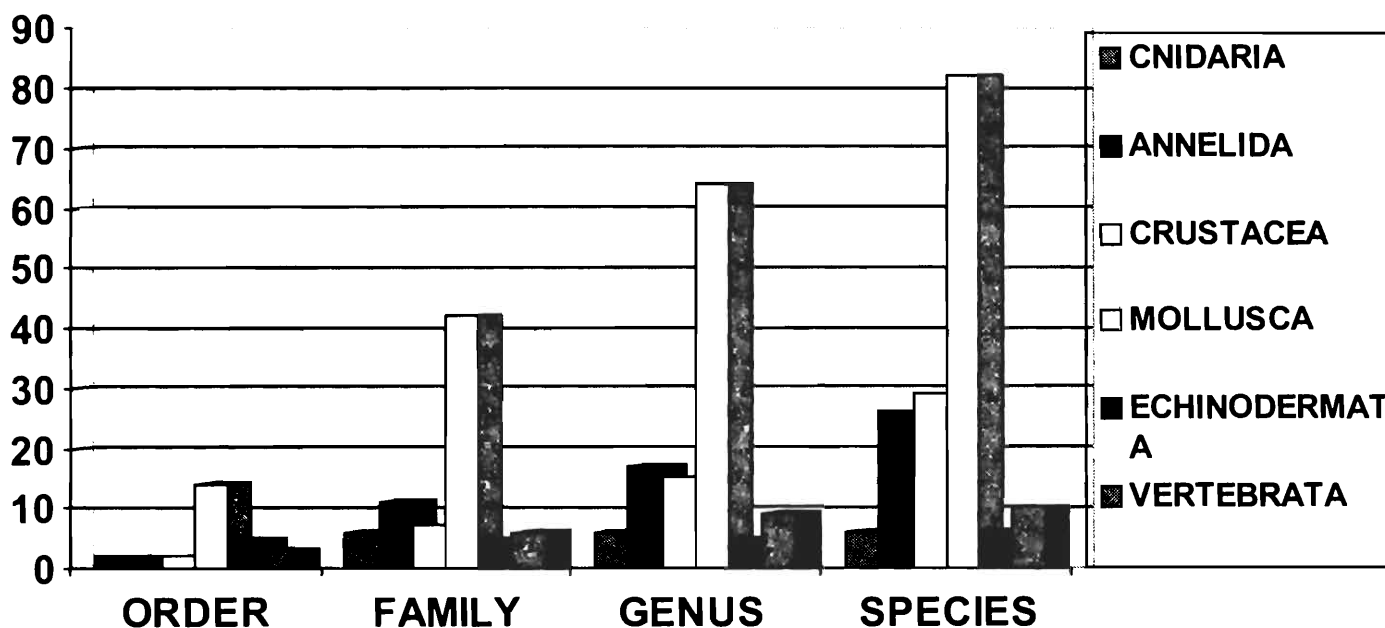


Fig. 3. Macrofaunal diversity of major groups in different taxonomical level.

THREATS AND CONSERVATION

Though the total estuarine belt is not very disturb area but till some part of this estuary are in stress. Such as Talsari, a very popular sea resort of Orissa, a large number of tourists came here all the year round, of which a large number of students collect zoological specimens from here, these are one of the causes to decline their population. Besides this, the recent advent of aquaculture industry in this area leads to the destruction of lot of invertebrate juveniles (including their egg capsules). The fishermen collect the juveniles of the other invertebrates along with the post larval stages of tiger prawn (*Penaeus monodon*) and throw away the other forms on the beach (Plate XXIII. A). This unscrupulous daily activity causes heavy loss of biodiversity of this area and causes ecological imbalance. Development of molluscan fishery is playing also a negative role in case of Biodiversity conservation, because it depends here only on capture fishery. Establishment of a Fishing Harbour in the vicinity of Talsari and Kirtania in the recent past may add to the destruction of this unique ecologically diverse habitat as well as its faunal resources.

Conservation measures should be taken to protect this fragile ecosystem, local people should be awared about the massive loss of different fauna during the prawn seed collection and some measures should be taken to minimize this loss.

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APPENDIX : 1**BIRDS OF SUBARNAREKHA ESTUARY AND ADJOINING AREA**

As birds are the important indicator of an ecosystem, the observations on the avifaunal diversity were done during the survey periods, during this time the authors came across 112 species of birds belonging to 40 families. Among those, 37 species of birds are considered as wetland birds. Only 24 species are seen in the mudflat of the estuarine mouth at Talsari and Kirtania. No doubt, plenty of food materials such as molluscs, polychaetes, cnidarians, crustaceans, etc and comparatively less disturbance attract those birds to this area. Here a list of the birds observed, are given with their common and local name, siting place and local availability status also mentioned.

S. No.	Scientific name with Systematic position	Common name	Local name	Location of Birding (If any specific site)	Status (in this area)
1.	Class AVES I. Order PODICIPEDIFORMES I. Family PODICIPEDIDAE <i>Podiceps ruficollis</i>	Dabchick	Pandubi	Fresh Water Jheel i at pante	Rare
2.	II. Order PELECANIFORMES II. Family PHALACROCORACIDAE <i>Phalacrocorax fuscicollis</i>	Indian shag	Pankawri		Not Common
3.	<i>P. niger</i>	Little cormorant	Pankawri	Beside the creeks at Talsari	Common
4.	III. Order CICONIFORMES III. Family ARDEIDAE <i>Ardea alba</i>	Large egret	Bada bak		Common
5.	<i>Ardeola grayii</i>	Pond heron	Konch bak	Beside Jheel, Pond, Canal	Common
6.	<i>Bubulcus ibis</i>	Cattle egret	Gaibak		Common
7.	<i>Egretta intermedia</i>	Smaller egret	Corchebak		Common
8.	<i>E. garzetta</i>	Little egret	Chhota Corchebak		Common
9.	<i>Nycticorax nycticorax</i>	Night heron	Bachka		common
10.	<i>Ixobrychus cinnamomeus</i>	Chestnut bittern	Lalbak	One sighted on a casurina tree at Udaypur	Rare
11.	<i>I. sinensis</i>	Yellow bittern	Katbak	Kirtania	Not Common
12.	IV. Family CICONIIDAE <i>Anastomus oscitans</i>	Openbill stork	Shamuk khol	Village near kirtania	Rare

S. No.	Scientific name with Systematic position	Common name	Local name	Location of Birding (If any specific site)	Status (in this area)
	IV. Order FALCONIFORMES V. Family ACCIPITRIDAE				
13.	<i>Milvus migrans</i>	Pariahkite	Cheel	Through out the region	Common
14.	<i>Accipiter badius</i>	Indian shikra	Shikre	Through out the region	Common
15.	<i>Haliaeetus leucogastor</i>	White bellied Sea-eagle	Gang cheel	One pair build nest on a Casurina tree at Talsari	Rare
16.	<i>Gyps bengalensis</i>	Indian white-backed vulture	Sakun		Not common
	VI. Family FALCONIDAE				
17.	<i>Falco naumanni</i>	Lesser kestrel	Baz	Casurina forest	Common
	V. Order GRUIFORMES VII. Family RALLIDAE				
18.	<i>Gallinula chloropus</i>	Indian moorhen	Jalmurgi	Near ponds	Rare
19.	<i>Amaurornis phoenicurus</i>	White breasted waterhen	Dauk		Common
20.	<i>Rallus aquaticus</i>	Indian wattail	Ambukukkut	Several sights at Mangrove bush at Talsari	Not common
	VI. Order CHARADRIIFORMES VIII. Family JAGANIDAE				
21.	<i>Metopidius indicus</i>	Bronzewinged jacana	Jalpipi	Village near Chandaneswar	Common
	IX. Family CHARADRIIDAE Subfamily CHARADRIINAE				
22.	<i>Vanellus indicus</i>	Redwattled Lapwing	Tritriv	cultivated field	common
23.	<i>V. malabaricus</i>	Yellowwattled lapwing	Tritriv	Talsari	Not common
24.	<i>Pluvialis diminica</i>	Eastern golden plover	Sonabatan	Along the sea beach and mud flat	common, Winter Migrant
25.	<i>Charadrius dudius</i>	Indian little ringed plover	Firia	Along the sea beach and mud flat	common, Winter Migrant
26.	<i>C. alexandrinus</i>	Kentish plover		Along the sea beach and mud flat	common, Winter Migrant with local pop.
27.	<i>C. mongolus</i>	Lesser sand plover		Along the sea beach and mud flat	common, Winter Migrant

S. No.	Scientific name with Systematic position	Common name	Local name	Location of Birding (If any specific site)	Status (in this area)
	Subfamily SCOLOEACINAE				
28.	<i>Tringa tetanus</i>	Common red shank		Along the sea beach and mud flat	common, Winter Migrant
29.	<i>T. stagnatilis</i>	Little greenshank /Marsh sandpiper		Along the sea beach and mud flat	common, Winter Migrant
30.	<i>T. nebularia</i>	Greenshank	Gotra	Along the sea beach and mud flat	Rare, Winter Migrant
31.	<i>T. glareola</i>	Spotted sandpiper	Balubatan	Along the sea beach and mud flat	common, Winter Migrant
32.	<i>T. terek</i>	Terk sandpiper		Along the sea beach and mud flat	common, Winter Migrant
33.	<i>T. hypoleucos</i>	Common sandpiper		Along the sea beach and mud flat	Common, Winter Migrant
	X. Family ROSTRATULIDAE				
34.	<i>Rostratula benghalensis</i>	Painted snipe	Baggarji	Only seen at mangrove bush of Talsari	Common
	XI. Family RECURVIROSTRIDAE				
35.	<i>Recurvirostra avosetta</i>	Avocet	Kusia chacha	Single specimen sighted at sea beach of udaypur	Very rare Winter Migrant
	XII. Family GLAREOLIDAE				
36.	<i>Glareola lactea</i>	Small Indian pratincole	Chhota babuibatan	Talsari	common, Winter Migrant
	XIII. Family LARIDAE				
37.	<i>Larus brunnicephalus</i>	Brown headed gull	Dhomra	Sea beach	common, Winter Migrant
38.	<i>L. ridibundus</i>	Brown headed gull	Dhomra	Sea beach	common, Winter Migrant
39.	<i>L. ichthyaetus</i>	Great black headed gull	Dhomra	Sea beach	common, Winter Migrant
40.	<i>Sterna aurantia</i>	Indian river tern	Gungcheel	Sea beach	Not Common
41.	<i>S. albifrons</i>	White shafted ternlet		Sea beach	Common
	VII. Order COLUMBIFORMES.				
	XIV. Family COLUMBIDAE				
42.	<i>Columba livia</i>	Indian blue rock pigeon	Gola pyra	Through out the area	Common

S. No.	Scientific name with Systematic position	Common name	Local name	Location of Birding (If any specific site)	Status (in this area)
43.	<i>Streptopelia decaocto</i>	Indian ring dove	Par ghughu	Through out the area	Not Common
44.	<i>S. chinensis</i>	Indian spotted dove	Chhit ghughu	Through out the area	Common
VIII. Order PSITTACIFORMES XV. Family PSITTACIDAE					
45.	<i>Psittacula krameri</i>	Roseringed parakeet	Tiya	Through out the area	Common
46.	<i>P. alexandri</i>	Redbreasted parakeet	Chandana Tiya	Through out the area	Not Common
XVI. Family CUCULIDAE					
47.	<i>Clamator jacobinus</i>	Pied crested cuckoo	Shahbulbul	—	LM, NC
48.	<i>Cuculus varius</i>	Brainfever bird	Chok gallo	—	NC
49.	<i>Centropus sinensis</i>	Crowpheasant/ Caucal	Kubo pakhi	—	C
50.	<i>Eudynamys scolopacea</i>	Indian Koel	Kokil	—	C
IX. Order STRIGIFORMES XVII. Family STRIGIDAE Subfamily TYTONINAE					
51.	<i>Tyto alba</i>	Indian barn Owl	Lakshmi Pecha	—	C
Subfamily STRIGIDAE					
52.	<i>Athene brama</i>	Spotted Owelet	Pecha	—	C
X. Order CAPRIMULGIFORMES XVIII. Family CAPRIMULGIDAE					
53.	<i>Caprimilgus sp.</i>	Nightjar	Ratchara	—	R
XI. Order APODIFORMES XIX. Family APODIDAE					
54.	<i>Apus affinis</i>	Indian house swift	Ababeel	—	C
55.	<i>Cypsiurus parvus</i>	Indian palm swift	Bathasi	—	C
XII. Order CORACIIFORMES XX. Family ALCEDINIDAE					
56.	<i>Ceryle rudis</i>	Pied king fisher	Phatka machhranga	Talsari to Kirtania	C
57.	<i>Alcedo atthis</i>	Small blue Kingfisher	Chota machhranga	Through out the area	C

S. No.	Scientific name with Systematic position	Common name	Local name	Location of Birding (If any specific site)	Status (in this area)
58.	<i>Pelargopsis capensis</i>	Brown headed stork billed	--	--	C
59.	<i>Halcyon smyrmensis</i>	White Breasted Kingfisher	--	—	C
60.	<i>H. pileata</i>	Blackcapped Kingfisher		Talsari mangrove forest area	Rare
XXI. Family MEROPIDAE					
61.	<i>Merops orientalis</i>	Green Bee-eater	Banspati	All over the area	C
62.	<i>M. philippinus</i>	Bluetailed Bee-eater		Only seen at Talsari	Wm
XXII. Family CORACIIDAE					
63.	<i>Coracias benghalensis</i>	Roller	Nilkantha	All over the area	C
XXIII. Family UPUPIDAE					
64.	<i>Upupa epops</i>	Hoopoe	Mohanchura	All over the area	LM
XIII. Order PICIFORMES					
XXIV. Family CAPITONIDAE					
65.	<i>Megalaima asiatica</i>	Bluethroated Barbet	Bada Basantabauri	All over the area	C
XIV. Order PASSERIFORMES					
XXV. Family ALAUDIDAE					
69.	<i>Eremopterix grisea</i>	Ashycrowned finchlark	Dhulachata	Open cultivated field	NC
70.	<i>Ammomanes phoenicurus</i>	Rufoustailed finchlark	Lalbharat	—	C
XXVI. Family HIRUNDINIDAE					
71.	<i>Hirundo rustica</i>	Swallow	Ababil	All over the area	C
72.	<i>Riparia Riparia</i>	Sand martin		Talsari	C
XXVII. Family LANIIDAE					
73.	<i>Lanius cristatus</i>	Brownshrike	Kasai pakhi	All over the area	C
XXVIII. Family ORIOLIDAE					
74.	<i>Oriolus oriolus</i>	Golden oriole	Sonabau	All over the area	NC
75.	<i>Oriolus xanthornus</i>	Black headed oriole	Benebau	All over the area	C
XXIX. Family DICRURIDAE					
76.	<i>Dicrurus adsimilis</i>	Black Drongo	Finga	All over the area	C
77.	<i>Dicrurus aeneus</i>	Bronzed Drongo		—	NC

S. No.	Scientific name with Systematic position	Common name	Local name	Location of Birding (If any specific site)	Status (in this area)
	XXX. Family ARTAMIDAE				
78.	<i>Artamus fuscus</i>	Ashy Swallow shrike	Talcharai	All over the area	C
	XXXI. Family STURNIDAE				
79.	<i>Sturnus malabaricus</i>	Grey Headed Myna		All over the area	C
80.	<i>Sturnus pagodarum</i>	Black Headed Myna	Harbola	—	NC
81.	<i>Sturnus contra</i>	Pied Myna	Guye Salik	—	C
82.	<i>Acridotheres tristis</i>	Indian Myna	Salik	—	C
83.	<i>Acridotheres ginginianus</i>	Bank Myna	Gung Salik	—	C
84.	<i>Acridotheres fuscys</i>	Jungle Myna	Jungli Salik	—	NC
	XXXII. Family CORVIDAE				
85.	<i>Dendrocitta vagabunda</i>	Indian Tree Pie	Hundichacha	All over the area	VC
86.	<i>Corvus splendens</i>	Indian House Crow	Kak	T.O.a	C
87.	<i>Corvus macrorhynchos</i>	Eastern Jungle Crow	Dund Kak	All over the area	C
	XXXIII. Family IRENIDAE				
88.	<i>Aegithina tiphia</i>	Common Iora	Fatikjal	All over the area	R
89.	<i>Chloropsis aurifrons</i>	Gold Fronted Chloropsis	Harewa		NC
	XXXIV. Family PYCNONOTIDAE				
90.	<i>Pycnonotus cafer</i>	Red Vented Bulbul	Bulbul	All over the area	C
91.	<i>Pycnonotus jocosus</i>	Red Whiskered Bulbul	Sipahi Bulbul	—	C
	XXXV. Family MUSCICAPIDAE				
92.	<i>Turdoides caudatus</i>	Common Babbler	Satbhai	All over the area	C
93.	<i>Turdoides striatus</i>	Jungle Babbler	Chhatarhia	—	C
94.	<i>Muscicapa parva</i>	Red Brested Flycatcher	Chatki	—	WM, C
95.	<i>Muscicapa thalassina</i>	Verditer Flycatcher	Nil Katkatia	—	R
96.	<i>Hypothymis azurea</i>	Black Naped Flycatcher	Kala Katkatia	Planted forest at Talsari	LM
97.	<i>Orthotomua sutorius</i>	Bengal Tailor Bird	Tuntuni		C

S. No.	Scientific name with Systematic position	Common name	Local name	Location of Birding (If any specific site)	Status (in this area)
XXXVI. Family TURDINAE					
98.	<i>Erithacus calliope</i>	Rubythroat	Gunpigora	Bushes of <i>Lantana camara</i>	R
99.	<i>Copsychus saularis</i>	Magpie-Robin	Dhaiyal	All over the area	NC
XXXVII. Family MOTACILLIDAE					
100.	<i>Anthus hodgsoni hodgsoni</i>	Indian Tree Pipit	Muchassi	All over the area	C
101.	<i>Anthus novaeseelandiae rufulus</i>	Paddy Field Pipit	Mathcharai	—	C
102.	<i>Motacilla indica</i>	Forest Wagtail	Khanjan	—	R
103.	<i>Motacilla cinerea</i>	Grey Wagtail	--	Casurina forest	C
104.	<i>Motacilla alba</i>	Pied Wagtail	Khanjan	All over the area	C
XXXVIII. Family DICAETIDAE					
106.	<i>Dicaeum agile</i>	Indian Thickbilled Flower Picker	--	All over the area	C
XXXIX. Family NECTARINIIDAE					
107.	<i>Nectarinia zeylonica</i>	Purplerumped Sunbird	--	—	C
108.	<i>Nectarinia asiatica</i>	Purple Sunbird	--	—	C
XXXX. Family PLOCEIDAE					
109.	<i>Passer domesticus</i>	House Sparrow	Charai	All over the area	C
110.	<i>Ploceus benghaleasis</i>	Indian Bya	Babui	—	R
111.	<i>Lonchura punctulata punctulata</i>	Indian spotted Munia	Munia	—	C
112.	<i>Lonchura malabarica malabarica</i>	White throated Munia	--	Village area at Kirtania	NC

Abbreviation used : C common; NC Not very common but not rare; R Rare; LM Local Migrant; WM Winter Migrant.

PLATE-1



A. Soft mud habitat at Talsari



B. Sandy hard mud at Kankrapal



C. Tidal creeks at Pantei



D. Mangrove at Kirtania



E. Collection at Kirtania

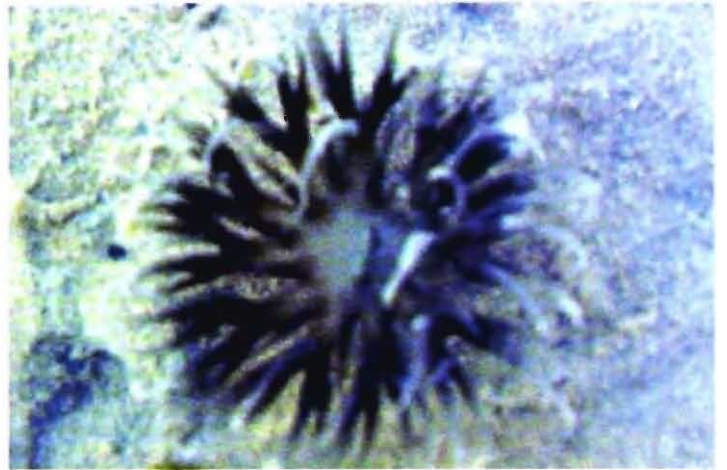


F. Talsari Fishing harbour

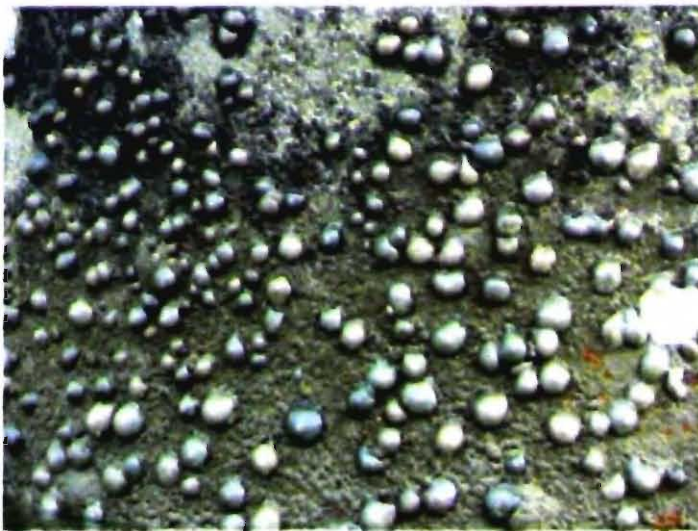
PLATE-II



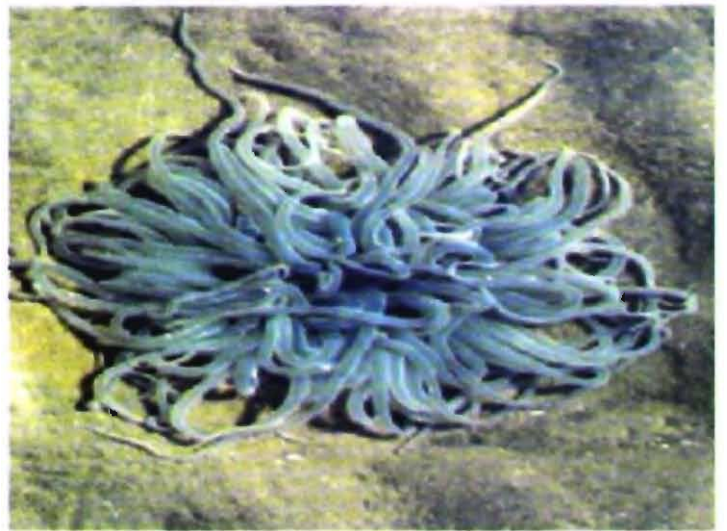
A. *Edwardsia jonesii* Seshaiya & Cuttress, 1969



B. *Pelocoetes exul* Annandale, 1915



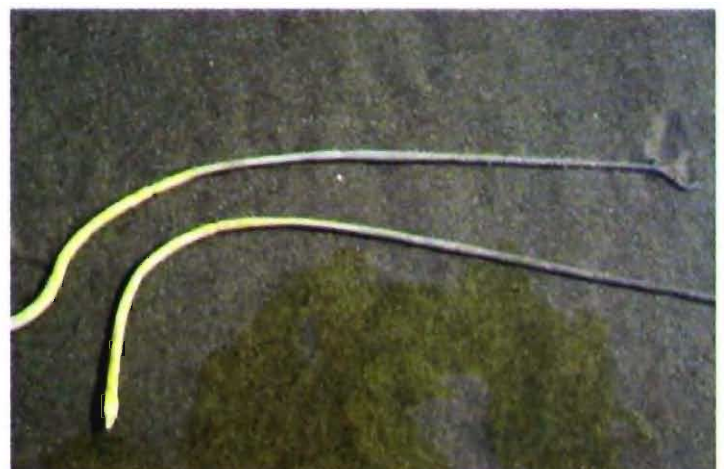
C. Large colony of short stalked Sea Anemone (*Diadumene schilleriana*)



D. *Paracondylactis indicus* Dave, 1957



E. *Cavernularia* sp.



F. *Virgularia* sp.

PLATE-III



A. *Chloeia parva* Baird, 1870



B. *Eteone barantollae* Fauvel, 1932



C. *Ceratonereis burmensis* Monro, 1937



D. *Dendronereis aestuarina* Southern, 1921



E. *Dendronereides heteropoda* Southern, 1921

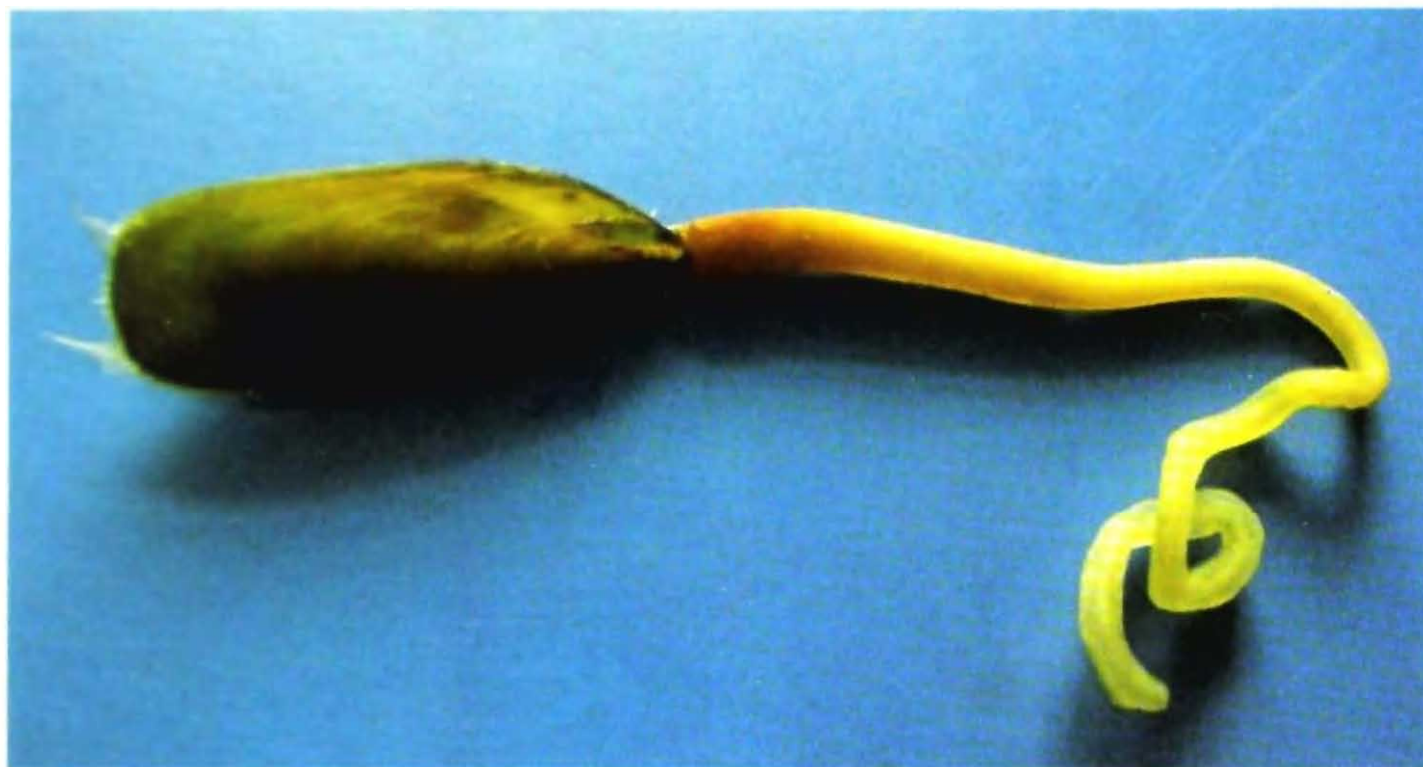


F. *Euclymene annandalei* Southern, 1921

PLATE-IV

A. *Perinereis cultrifera* (Grube, 1840)B. *Lumbrineris notocirrata* (Fauvel, 1932)C. Tube nest colony of *Diopatra cuprea*
(Bosc, 1802)D. *Lumbrineris polydesma* (Southern, 1921)E. *Glycera convoluta* Keferstein, 1862F. *Loimia medusa* (Savigny, 1818) in its
natural habitat

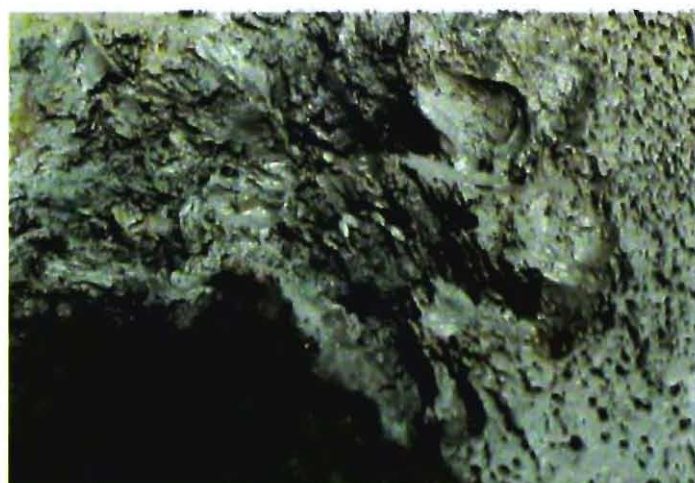
PLATE-V



A. *Lingula anatina*



B. Habitat and nest hole pattern of *Lingula anatina*



C. Juveniles colony of *Lingula anatina* in sticky mud



D. *Lingula anatina* and its nest hole opennings

PLATE-VI



A. *Chthamalus stellatus* (Poli, 1791)



B. *Balanus amphitrite* Darwin, 1854.



C. *Diogenes affinis* Henderson, 1893



D. *Clibanarius clibanarius* (Herbst, 1791)



E. *Coenobita cavipes* Stimpson



F. *Clibanarius padavensis* De Man, 1888.

PLATE-VII



A. *Ocypode macrocera* H. Milne Edwards, 1837



B. *Uca (Deltuca) rosea* (Tweedie, 1937)



C. *Uca (Deltuca) dussumieri* (Crane, 1775) in habitat



D. *Uca (Celuca) lactea* (de Haan, 1835) in habitat



E. *Uca (Celuca) triangularis*(H. Milne Edwards, 1873)



F. *Uca (Celuca) lactea* (de Haan, 1835)

PLATE-VIII

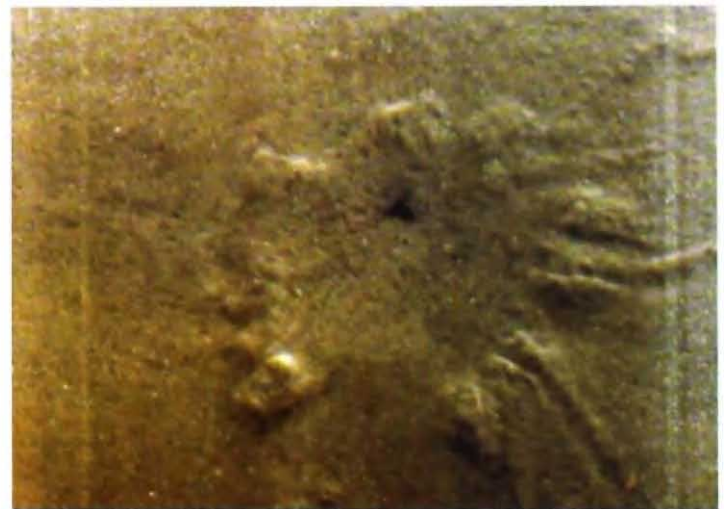
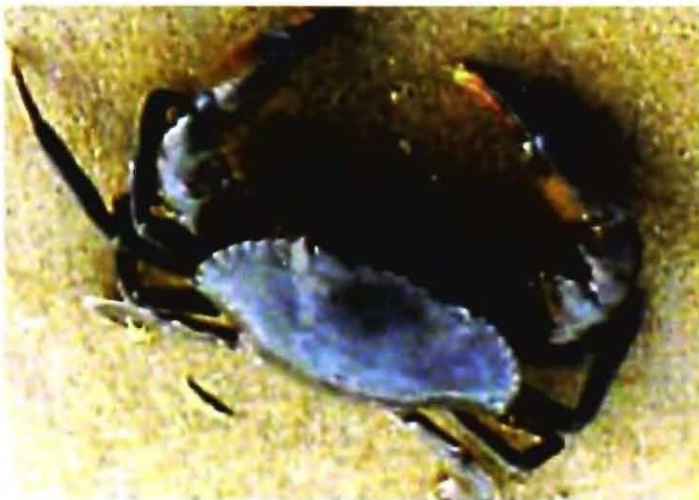
A. *Dotilla blanfordi* Alcock, 1900B. *Macrophthalmus transversus* (Latreille, 1817)C. Nest hole of *Dotilla blanfordi* Alcock, 1900D. Nest hole of *Macrophthalmus transversus* (Latreille, 1817)E. *Scylla serrata* (Forsk., 1775)F. *Varuna litterata* (Fabricius, 1798)

PLATE-IX



A. *Metaplax dentipes* (Heller, 1865)



B. *Metaplax crenulata* (Gerstaecker, 1856)



C. *Metaplax distincta* H. Milne Edwards, 1852



D. *Metaplax indica* H. Milne Edwards, 1852



E. *Metaplax indica* H. Milne Edwards, 1852
Ventral view



F. *Seasarma quadrata* (Fabricius, 1798)

PLATE-X



A. *Metapograpsus messor* (Forsk., 1775)



B. *Metapograpsus messor* (Forsk., 1775)



C. *Grapsus albolineatus* Lamarck, 1818



D. Nest hole of *Ocypode macrocera* at Talsari



E. *Metaplax dentipes* (Heller, 1865)
in habitat



F. *Seasarma quadrata* (Fabricius, 1798)
in habitat

PLATE-XI



A. *Umboonium vestiarius* (Linnaeus, 1758)



B. *Neritina (Vittina) smithi* Wood, 1828



C. *Nerita (Amphinerita) articulata*
Gould, 1847



D. *Bellamyia bengalensis* (Lamarck, 1822)



E. *Littorina (Littorina) undulata* Gray, 1839



F. *Littorina (Littorinopsis) melanostoma*
Gray, 1839

PLATE-XII



A. *Littorina (Littorinopsis) scabra scabra*
(Linnaeus, 1758)



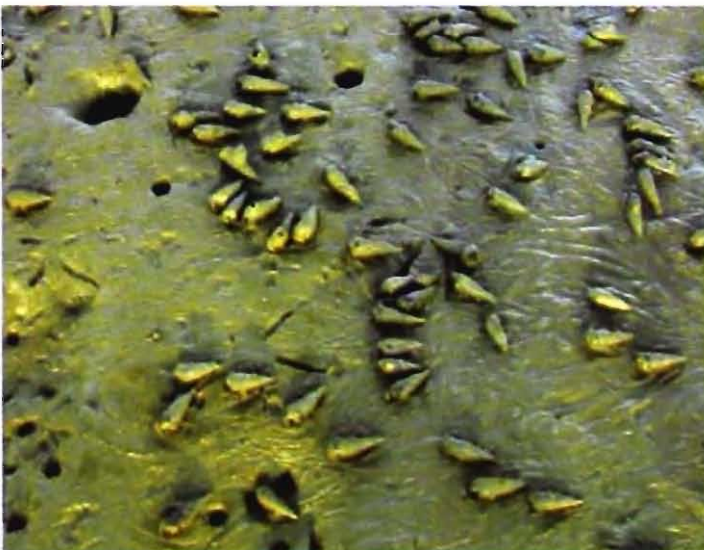
B. *Stenothyra deltae* (Benson, 1836)



C. *Assimenea* sp. crawling on the soft mud.



D. *Assimenea brevicula* (Pfeiffer, 1854)



E. *Cerithidea cingulata* at mud (Gmelin, 1791)



F. *Cerithidea obtusa* (Lamarck, 1822)

PLATE-XIII



A. *Turritella attenuata* Reeve, 1869



B. *Natica lineata* (Roeding, 1798)



C. *Natica vitellus* (Linnaeus, 1758)



D. *Natica tigrina* (Roeding, 1798)

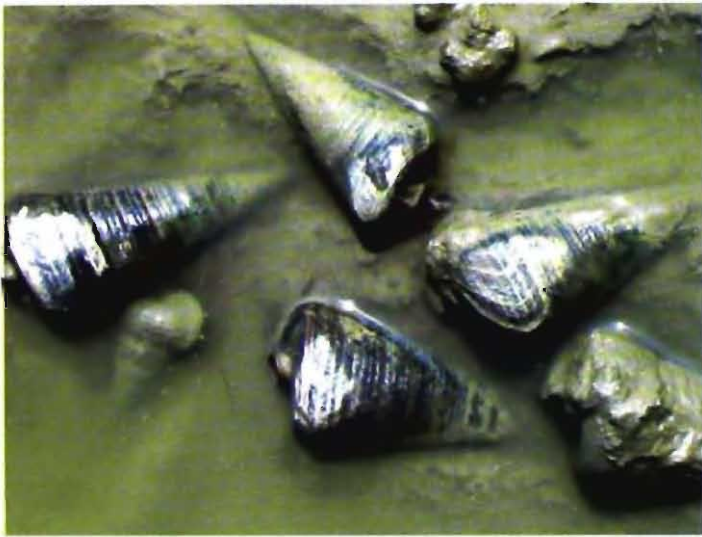


E. *Polinices (Glossaulax) didyma*
(Roeding, 1798)



F. *Architectonica perspectiva*
(Linnaeus, 1755)

PLATE-XIV



A. *Telescopium telescopium* (Linnaeus, 1758)



B. *Bursa spinosa* (Lamarck, 1843)



C. *Thais lacera* (Born, 1778) on the oyster bed



D. *Murex tribulus* Linnaeus, 1758



E. *Pugilina cochlidium* (Linnaeus, 1758)



F. *Nassarius stolatus* (Gmelin, 1791)

PLATE-XV



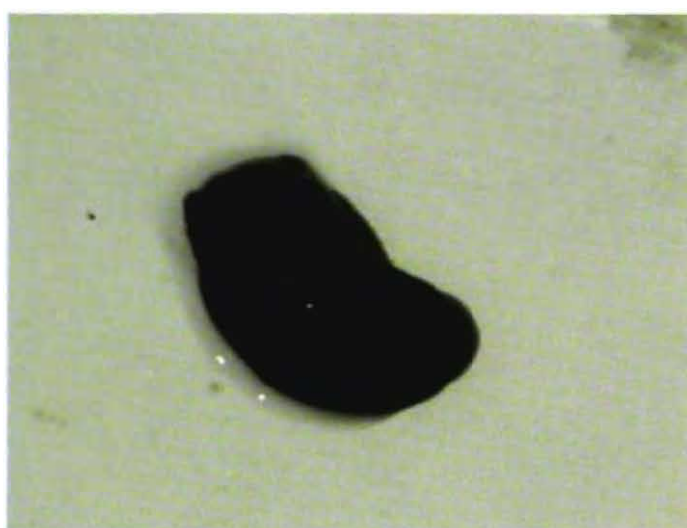
A. *Olivancillaria gibbosa* (Born, 1778)



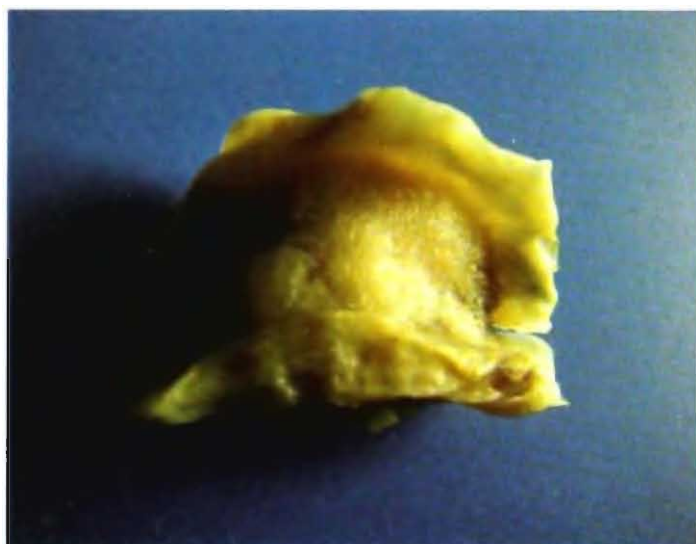
B. *Amalda ampla* (Gmelin, 1791)



C. *Turricula javana* (Linnaeus, 1767)



D. *Melanochlamys* sp.



E. *Pleurobranchea* sp.



F. *Armina* sp.

PLATE-XVI

A. *Onchidium typhae* (Buchanan, 1800)B. *Onchidium tenerum* Stoliczka, 1869C. *Ellobium gangeticum* (Pfeiffer, 1855)D. *Cassidula nucleus* (Gmelin, 1791)E. *Pythia plicata* (Ferussac) Gray, 1825F. *Anadara granosa* (Linnaeus, 1758)

PLATE-XVII



A. *Scapharca deyrollei* Jousseaume, 1893



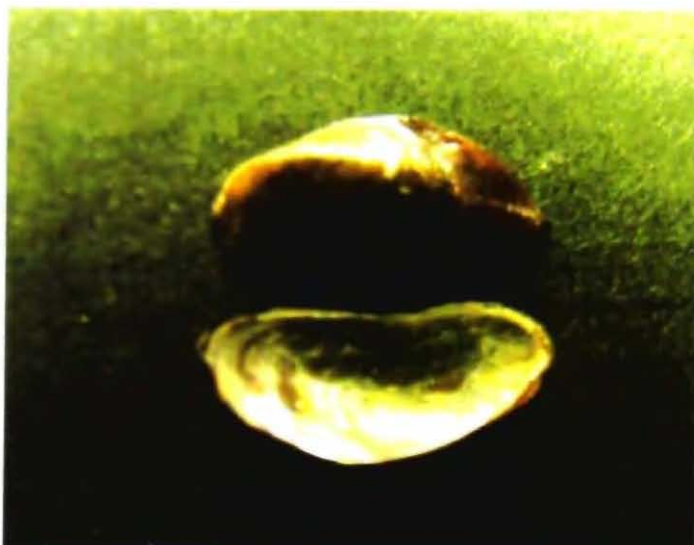
B. *Perna viridis* (Linnaeus, 1758)



C. *Perna viridis* (Linnaeus, 1758)
attached in concretions.



D. *Modiolus tulipa* (Lamrack, 1836)



E. *Modiolus striatulus* Hanley, 1844



F. *Saccostrea cucullata* (Born, 1778)

PLATE-XVIII

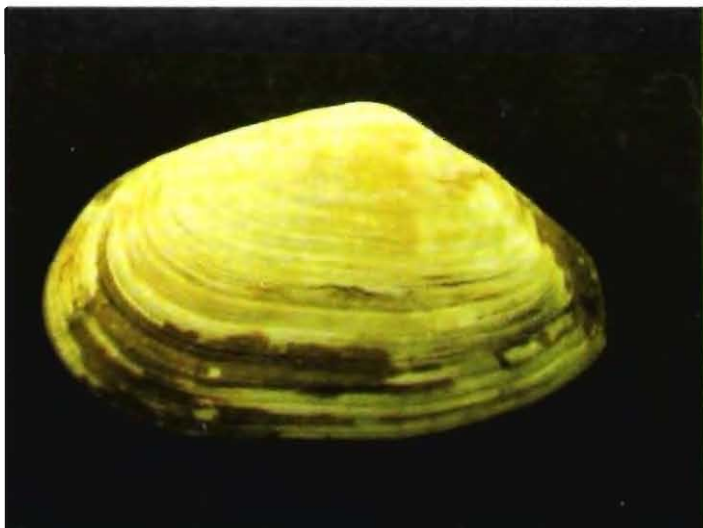
A. *Enigmonia enigmatica* Holten, 1795B. *Anomia achaeus* Gray, 1839C. *Solen brevis* Gray, 1842D. *Siliqua radiata* (Linnaeus, 1756)E. *Macoma birmanica* (Philippi, 1849)F. *Apolymetis edentula* Spengler, 1782

PLATE-XIX



A. *Meretrix meretrix* (Linnaeus, 1758)



B. *Paphia textilis* (Gmelin, 1791)



C. *Mactra violacea* Gmelin, 1791



D. *Mactra (Mactrinula) luzonica* Deshayes, 1854



E. *Sanguinolaria (Soletellina) acuminata*
(Deshayes, 1857)



F. *Donax (Hecuba) scortum* Linnaeus, 1758

PLATE-XX

A. *Donax (latona) incarnatus* Gmelin, 1791B. *Glauconome sculpta* Sowerby, 1894C. Nest hole of *Glauconome sculpta*
Sowerby, 1894D. *Barnea candida* (Linnaeus, 1758)E. *Martesia fragilis* (Sowerby, 1873)F. *Laternula truncata* (Lamarck, 1818)

PLATE-XXI



A. *Phasolosoma arcuatum* (Gray, 1828)



B. *Anelassorhynchus microrhynchus*
(Prashad, 1919)



C. *Thorsonia investigatoris* (Koehler & Vaney, 1908)



D. *Acaudina molpadioides* (Semper, 1868)



E. *Astropecten indicus* Doederlein, 1872



F. *Ophiactis modesta* Brock, 1889

PLATE-XXII



A. *Temnopleurus toreumaticus* (Leske, 1778)



B. *Moringua raitaborua* (Hamilton, 1822)



C. *Boleophthalmus bodderti* (Pallas, 1770)



D. *Taneoides anguillaris* (Linnaeus, 1758)



E. *Periophthalmus novemradiatus* (Hamilton-Buchanan, 1822)



F. *Cerberus rhynchops* (Schneider, 1799)

PLATE-XXIII



A. Collection of post larvae of Tiger Prawn



B. Subarnarekha estuary (Kirtania)