



Estuarine Ecosystem Series No. 3

FAUNA OF MAHANADI ESTUARY

ORISSA

Published in Commemoration of the 50th Anniversary of India's Independence



ZOOLOGICAL SURVEY OF INDIA
1998

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**FAUNA OF MAHANADI ESTUARY
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*Published in Commemoration of the 50th Anniversary of
India's Independence*

Edited by
The Director, Zoological Survey of India



सत्यमेव जयते

**Zoological Survey of India
Calcutta**

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Project Coordinator

Dr. S. K. Mitra

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FOREWORD

The Mahanadi estuarine system, the largest in Orissa and one of the most important estuaries in India, lies in the Cuttack and Puri districts. The tide in the estuary stretches its influence upto 32 km from the mouth of the river. The estuary is endowed with mangrove vegetation and is characterised by an intricate network of canals and creeks interspersed with islands, mudflats and sandy shores at the mouth region. It supports an appreciable number of commercially important fishes and crustaceans and also serves as the economic base for the local fishermen communities.

Scientists of the Zoological Survey of India, Estuarine Biological Station, Berhampur, undertook ten surveys along the estuary during February 1989 to April 1992 and studies were made by a number of experts of various groups of invertebrates and vertebrates of this department for faunal inventory of the estuary. As such this volume is the third in the Estuarine Ecosystem Series and the second from the State of Orissa followed by the report on Rushikulya Estuary (1992), published by the Zoological Survey of India. I am sure that the present document will further enrich our knowledge on faunal elements of Indian estuaries.

I wish to express my deep sense of appreciation to all the participating scientists and staff members connected with the survey work and who contributed scientific papers in their respective specialised field for this volume and to Dr. S. K. Mitra, Scientist-in-Charge of Estuarine Biological Station, Berhampur for coordinating this project work.

Calcutta
August, 1998

Dr. J.R.B. Alfred
Director
Zoological Survey of India

PREFACE

The Mahanadi estuary has been the focus of the Estuarine Biological Station, Zoological Survey of India, Berhampur after completion of the survey work of fauna of Chilka lake. The estuary was surveyed at eleven selected sites from 1989 to 1992.

Besides a few publications on molluscs (Subba Rao, 1968; Subba Rao and Mukherjee, 1975) and fishes (David 1956; Jayaram and Majumdar, 1976; Shetty, 1963; Shetty *et al.*, 1965; Venkateswarlu *et al.*, 1993a-e), the fauna of Mahanadi remained unexplored for most of the groups. During field trips, specimens as well as data on some water quality parameters were collected. The collected specimens were referred to respective specialists for identification and study. As a result, a total of 231 species of vertebrates viz., Aves 46, Fishes 180, Snakes 4 and Testudine 1 and 242 species of invertebrates belonging to Echinoderms (2 species), shoreline insects (3 species), Arachnid (1 species), Crustaceans (44 species), Hermit crabs (4 species), Polychaetes (33 species), Leech (1 species), Molluscs (149 species), Coelenterates (3 species) and Sponges (2 species) have been recorded. The diversity of fishes and crustaceans suggests that the Mahanadi estuarine system is one of the richest and most productive estuaries in India which plays a key role on the livelihood of the local fishermen as well as those from the adjacent states of Orissa.

As a coordinator of the project, it is a pleasant duty to express my indebtedness to Dr. A. K. Ghosh, former Director and Dr. J.R.B. Alfred, present Director of the Zoological Survey of India, Calcutta for permitting and motivating us to undertake this project.

I am thankful to my colleagues viz., Shri T. Venkateswarlu, Dr. D. S. Mathur, Dr. C.A.N. Rao, Shri S.C. Nahar, Shri A. Mahapatra, Shri J.G. Pattanayak and Shri D.V. Rao of this Station for helping me in various ways.

I am grateful to the State College of Fisheries, Berhampur; Prof. and Head, Zoology Department, Berhampur University, Forest Department and Paradeep Port Trust Authorities, Govt. of Orissa for their kind co-operation during undertaking the survey work and numerous courtesies.

Lastly, my thanks are due to Shri Rati Ram and Dr. N.C. Nandi for the editorial assistance while finalising this volume.

DR. S.K. MITRA

Scientist SF,

Project Coordinator

CONTENTS

<i>FOREWORD</i>	.....	<i>III</i>
<i>PREFACE</i>	.....	<i>V</i>
AN OVERVIEW		
S. K. Mitra & T. Venkateswarlu	.....	1
AVES		
A. Mohapatra	.....	17
FISHES		
T. Venkateswarlu et. al.	.....	23
SNAKES		
T. Venkateswarlu et. al.	.....	115
HERMIT CRABS (CRUSTACEA : DECAPODA)		
K. Narapu Reddy & P. Krishna Murthy	.....	125
CRUSTACEA		
Maya Deb	.....	129
MOLLUSCA		
K. V. Surya Rao & S. Maitra	.....	161
POLYCHAETA : ANNELIDA		
C. A. Nageswara Rao	.....	199
PORIFERA		
J. G. Pattanayak	.....	211
OTHER GROUPS		
J. G. Pattanayak & B. P. Haldar	.....	215

AN OVERVIEW

S. K. MITRA & T. VENKATESWARLU

Zoological Survey of India, Calcutta

INTRODUCTION

The Mahanadi estuarine system is one of the major estuaries in India and the largest estuary in Orissa. It is spread over a wide area in the Cuttack and Puri districts of about 165 kilometers of coast line along the coast of Bay of Bengal. It is located within latitudes 19°47' N. and 20°30' N and longitudes 85°33' E and 86°49' E. It extends from the northern end of Hukitola lake in the north in Cuttack district, to the north-eastern extremity of Chilka Lake in the south in Puri district.

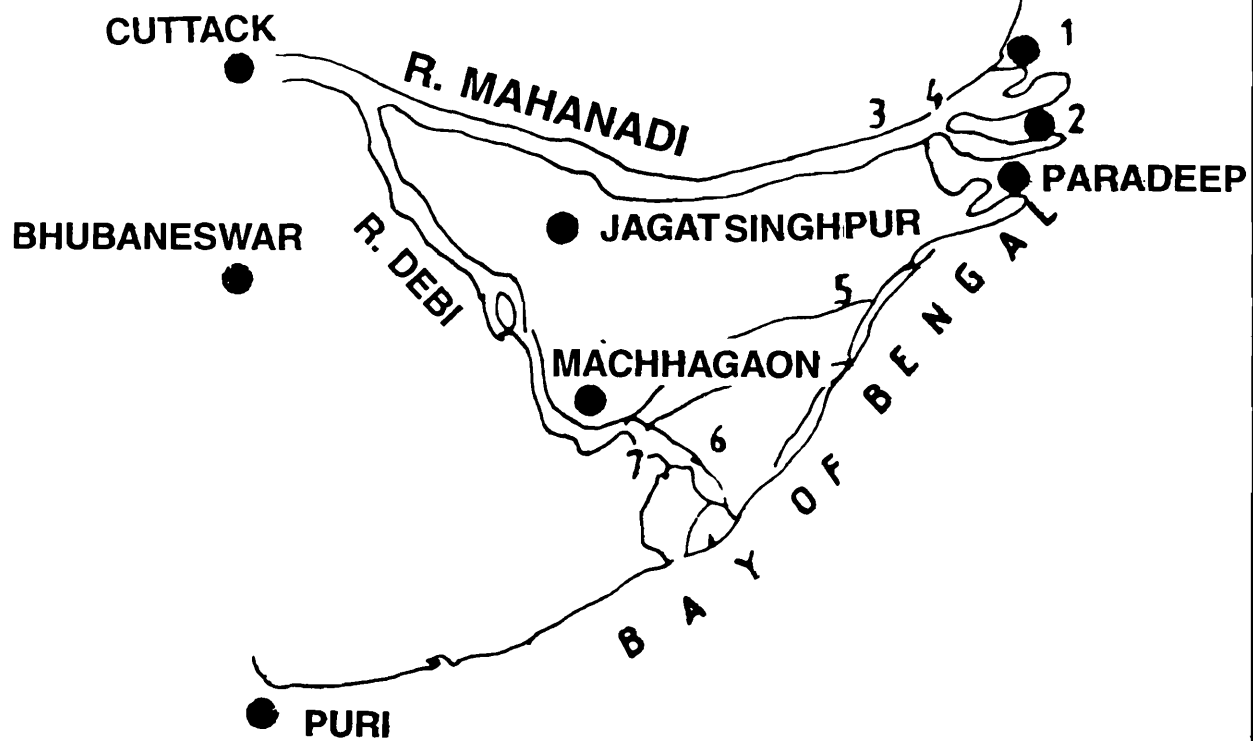
The Mahanadi originates from Amarkantaka region of Madhya Pradesh and flows through Madhya Pradesh and Orissa state over a length of 890 kms having drainage basin of about 141600 km² with a large catchment area. It enters Orissa through Sambalpur district followed by Balangir district and then through Boudh-Phulbani districts border areas, finally into Cuttack district. Afterwards Mahanadi divides into two main rivers Devi River & Mahanadi proper. Other tributaries such as Kathajodi, Kuakhae, Daya Vargavi etc. arise from this. The main river opens into the Bay of Bengal at Paradeep in Cuttack District. Devi river opens into sea near Astaranga in Puri District. Some tributaries meet the main river, Devi river and Chilka Lagoon and the other tributaries directly open into Hukitola lake, which is 15 kms away from main river mouth at Paradeep. It is an oblong body of shallow brackish water covering an area of about 104 sq.kms. with a length of about 13 kms., and a width of about 8 kms., at its north-eastern end. It has a wide opening into sea at its north-eastern end. The tidal stretch extends upto 32 kms from the mouth.

Almost all the places of the estuary are not approachable by roads. Hence most of the sites have been surveyed by mechanised boats.

The entire area is full of mangrove vegetation together with mud flats traversed by a network of tidal creeks except some areas like Paradeep mouth region and Astaranga mouth region which are Sandy shoreline. Main flora of mangroves are formed of *Avicennia officinales*, *A. alba*, *A. marina*, *Rhizophora mucronate* which are more abundant on the banks of the river mouth and are characterised by reddish and jointed pneumatophores. The other flora of this mangrove swamps are *Bruguiera conjugata*, *Ceriops roxburghiana*, *Sonneratia apetala*, *Lumnitzera racemosa*, *Aegiceras corinculatum*, *Excoecaria agallocha*, *Arthrocnemum indicum*, *Salicornia brachiata*, *Suaeda maritima* and *Suaeda mudiflora*.

A large part of mangrove swamps is submerged during the monsoon months. It is an intricate network of canals and creeks interspersed with islands of alluvium and detritus brought down from the forests. This detritus from the mangrove forests provides food for fishes, prawns and other animals. The mangrove plays a vital role in the economy of the area both for human beings as well as for the fauna. The mangroves are used generally as fuel and a red dye extracted from the bark of *Ceriops roxburghiana* is used for preserving fishing nets. For the animals the mangrove provides rich detritus

MAP SHOWING MAHANADI ESTUARY



COLLECTION LOCALITIES

1. Gangolia
2. Hukitola
3. Mangrove Forest
4. Light House
5. Saherbedi
6. Sunadhara
7. Ashtaranga

Map 1

and shelters. The mangrove forests also check the soil erosion due to tidal effects.

In the estuary, fishing crafts used are mainly ordinary and mechanised boats. No trawler is used within the estuary but are seen to be used in the sea.

The various fishing gears used in fishing can be grouped mainly into nine different categories, namely Seines, gill nets, bag nets, drag nets, set barriers, cast nets, scoop nets, hooks and line and spears. Of these, the first five are more predominant than the rest.

COLLECTION LOCALITIES

1. *Mahanadi Mouth, Paradeep* : This is close to the Paradeep Port Guest House. The sea coast and the edge of river bank at this area is protected by dumping huge boulders. The collections were made on this bank for one kilometer stretch starting from the boulder area towards the upstream of the river. High tidal influence is noticed as vast areas were exposed during low tide and at this time shore collections were made from the exposed mud flats. Near the mouth, the coast is sandy while the upstream sediments consist of a mixture of sand and mud.
2. *Mouth of Mahanadi, Light House Side, Paradeep* : This is near mouth of the river; at the opposite side of the Paradeep Port Guest House. Towards the sea the shore line of the river is sandy and about 10–15 mts. of the beach is exposed during the low tides. Towards the up-stream of the river the beach becomes more muddy. Huge mud flats with intermittent shallow water pools are there.
3. *Hukitola Mangrove Forest* : Hukitola is a narrow and lengthy land mass opposite to the Mahanadi estuary complex. Hukitola land mass which is about few kms from the river mouth. The streams and creeks of the estuarine complex of the Mahanadi meet at Hukitola lake. Hukitola land mass is like an island within this lake. The water of the lake is less saline and highly turbid. River banks and Hukitola land mass is full of mangrove vegetation. To approach Hukitola one has to go through the village called Jumbo situated on the bank of Gobori river which is about 65 kms from Paradeep. The river Gobori along with the other branches of Mahanadi river opens into a vast lagoon like water body. On way to Hukitola other creeks were also seen with mangrove vegetation. High tidal influence is there and mangrove forests are submerged with sea water. During low tides the depth in the lagoon and in the river is reduced to about two feet there by making it difficult even to travel in the boat. During low tides vast areas of mud flats are exposed on either side of the river banks. Hukitola is having sandy beaches on all sides except the northern tips and having casurina plantations.
4. *Mangrove forest adjacent to Paradeep* : This locality is on the other side of the river opposite to Paradeep. A thick mangrove forest is there, traversed with several canals. The area is muddy. Most of the area is exposed in low tidal influence.
5. *Batteghara (light house)* : This is about 15 kms from Paradeep situated on the bank of a canal connected to the Mahanadi river and approachable only by boat through canal. There are several canals amidst mangrove swamps in this area. Some of the mangrove forests are reserve forests. Mud skippers are plenty in this area.

There is a light house here, opened by British in 1937. Near light house a jetty is there and few villages are situated on the left bank of the Canal.

6. **Gangolia** : This area is on the Mahanadi river bank about 4 to 5 kms away from the mouth of Mahanadi river on the Paradeep side. Here the river divides into two branches, one ends into a creek and flows through the Paradeep town as back waters. Here the coast is muddy but very hard with marshy vegetation. Less faunal composition is noticed here.
7. **Mahanadi river, near Luna bridge** : This place is about 30 kms from Paradeep. Here the river is wide with paddy field and ground nut fields on either side. The coast is of loam soil type. The river water is less saline and the tidal influence together with increasing salinity could be found only in summer season. There are muddy areas in the banks of the river and in the middle region with sand.
8. **Chowmuhani, Musandia** : This place is about 5 to 6 kms. upstream from the river mouth and can be reached by road from Paradeep which is about 35 kms from Paradeep. On one side of the river a small village called Musandia is situated. On the other side of the river Bahakuda village is situated. Bahakuda is an island formed between two rivers and meets about 1 km down of the Musandia village. The coast line of the river is muddy with hard laterite soil. The faunal composition is very less. On the other side of the river the island is muddy with Cashew plantations. However, towards the meeting points of the rivulets the coast is formed of hard muddy soil. Only crab populations are seen in good numbers.
9. **Gandakula, Sunadhara, Devi river estuary** : This place is about 100 kms from the Paradeep port Guest House and for reaching the place, one has to travel via Jagatsingapore, Balikuda and Machhangam. The collection site is on the bank of the river Devi and the river mouth is about 12 to 15 kms away from this place. Here the river is wide and divided into two or three branches and after some distance it is united and formed a single branch near Astaranga. Between these branches huge land masses are seen, some with cultivated lands. During rainy season many of these land masses are submerged. Though the coast is sandy but it is with casurina plantations. Some places of the coast is muddy with mixed sand and mud being noticed during low tide. Tidal influence is more and 10 to 15 metres of the coast is exposed due to low tides. The fauna in the coast is less with a few numbers of small crabs, polychaetes and molluscs.
10. **Near new fishing jetty, Devi River** : Devi river, the branch of Mahanadi is quite deep and broad here. The mouth is 5 to 6 kms away from this place and tidal influence is also seen in this area. The river water enters into several shallow areas forming a small creek like body and with heavy growth of aquatic grasses of marshy nature which are seen submerged in the water. In these areas the bottom is muddy. Populations of aquatic birds are seen feeding on benthic organisms. The coast of river in this area is muddy at some places, sand mud mixture at some other places inhabiting populations of polychaetes and few molluscs. More fishing activities are seen in this area. Vast shallow areas are exposed during low tidal influence.
11. **Near Devi river mouth, Astaranga** : This area is about 3 kms from the fishing jetty and is close to the mouth. Here the river is wide and divides into two small branches before joining the sea. Very high tidal influence is seen and the waters are mostly saline. Vast shallow areas are exposed during low tides. These exposed areas are highly muddy mixed with sand. At some places the muddy site is upto 1 to 2 meters deep. The sand mud areas are found to contain varieties of benthic marine organisms.

SURVEYS UNDERTAKEN

Ist Mahanadi Estuary Survey :

Party : Shri T. Venkateswarlu, Scientist 'SD' (Leader)
Shri D. V. Rao, Zool. Asstt.
Shri P. N. Jena, Lab. Attendant
Shri R. K. Sabat, Motor Driver

Duration : 16 days from 8.2.1989 to 23.2.1989

IInd Mahanadi Estuary Survey :

Party : Shri T. Venkateswarlu, Scientist 'SD' (Leader)
Shri D. V. Rao, Zool. Asstt.
Shri P. N. Jena, Lab. Attendant
Shri R. K. Sabat, Motor Driver

Duration : 18 days from 20.7.1989 to 7.8.1989

IIIrd Mahanadi Estuary Survey :

Party : Dr. D. S. Mathur, Scientist 'SD' (Leader)
Jointly with Dr. S. K. Mitra, Scientist 'SE'
Shri S. C. Nahar, Sr. Zool. Asstt.
Shri P. Varma, Photographer
Shri R. K. Sabat, Motor Driver
Shri P. N. Jena, Lab. Attendant

Duration : 12 days from 2.12.1989 to 13.12.1989

IVth Mahanadi Estuary Survey :

Party : Dr. C. A. Nageswar Rao, Scientist 'SD' (Leader)
Shri S. C. Nahar, Sr. Zool. Asstt.
Shri D. V. Rao, Zool. Asstt.
Shri A. Mohapatra, Zool. Asstt.
Shri R. K. Sabat, Motor Driver

Duration : 15 days from 7.2.1990 to 21.2.1990

Vth Mahanadi Estuary Survey :

Party : Shri T. Venkateswarlu, Scientist 'SD' (Leader)
Shri D. V. Rao, Sr. Zool. Asstt.
Shri R. K. Sabat, Motor Driver

Duration : 14 days from 17.7.1990 to 30.07.1990

VIth Mahanadi Estuary Survey :

- Party :** Dr. C. A. Nageswara Rao, Scientist 'SD' (Leader)
 Shri D. V. Rao, Sr. Zool. Asstt.
 Shri J. G. Pattanayak, Sr. Zool. Asstt.
 Shri R. K. Sabat, Motor Driver
- Duration :** 13 days from 15.10.1990 to 27.10.1990

VIIth Mahanadi Estuary Survey :

- Party :** Dr. S. S. Mathur, Scientist 'SE' (Leader)
 Shri S. C. Nahar, Sr. Zool. Asstt.
 Shri A. Mohapatra, Sr. Zool. Asstt.
 Shri R. K. Sabat, Motor Driver
 Shri B. Dalai, Lab. Attendant
- Duration :** 14 days from 20.11.1990 to 3.12.1990

VIIIth Mahanadi Estuary Survey :

- Party :** Shri T. Venkateswarlu, Scientist 'SE' (Leader)
 Shri D. V. Rao, Sr. Zool. Asstt.
- Duration :** 12 days from 14.3.1991 to 25.3.1991

IXth Mahanadi Estuary Survey :

- Party :** Shri T. Venkateswarlu, Scientist 'SE' (Leader)
 Shri J. G. Pattanayak, Sr. Zool. Asstt.
- Duration :** 9 days from 4.3.1992 to 12.3.1992

Xth Mahanadi Estuary Survey :

- Party :** Dr. C. A. Nageswara Rao, Scientist 'SD' (Leader)
 Shri S. C. Nahar, Sr. Zool. Asstt.
- Duration :** 10 days from 7.4.1992 to 16.4.1992

METHODOLOGY

Polychaetes, Sea anemones, Isopods etc. were collected by digging muddy areas with shovel in low tide. It is very difficult to collect Polychaetes as they go down several feet deep in soil in their tubes, while digging. Similar is the case with sea anemones also. They are preserved in rectified spirit. Fishes are collected by operating fishing nets. Prawns, Crabs, Snakes, etc. also come in the nets. They are preserved in 4% formaldehyde solution. Dry shells were collected and kept in polythene covers. Polychaetes and Molluscs are narcotised before preserving in spirit.

ACKNOWLEDGEMENT

The authors wish to thank to the Director, Zoological Survey of India, Calcutta for encouragement and facilities.

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
1st Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mahanadi Mouth Paradeep	10.2.89	27	26	7.5				10	5	4		5		4					70				1	38				
do	11.2.89	25.5	24.5	7.5				1	14	8		72		60	1				25					12				
do	12.2.89	25	23	7.5				7	1	5	3	14												55				
Sunadhara	13.2.89	27	25	7.0				4	11	16	13								9	40		1		107				
Mahanadi mouth Paradeep	14.2.89	25	23	7.0						9									67	22				72				
Opposite side Paradeep	15.2.89	27	26	7.0							5													26				
Mahanadi mouth Paradeep	15.2.89	27	25	7.0						2		12					1		7					30				
Over Bridge Mahanadi	16.2.89	29	26.5	7.5				9																				
Luna Bridge	16.2.89	30	27	7.0				16		10	80													12				
Mahanadi Branch	16.2.89	34	28	7.5							1								150					20				
Opposite side Paradeep	17.2.89	28	27	7.0						21		12	8											70				
Mahanadi mouth Paradeep	17.2.89	28	27	7.0						1	35																2	
Mahanadi mouth Paradeep	18.2.89	29	28	7.0						1									31			1		98				
do	19.2.89	30	29	7.5				2		5	3		5									2		145				
do	20.2.89	30	29	7.0				3		5	4		5									1		140				
Devi River Astaranga	21.2.89	30	29	7.5						6			3											43				
do	22.2.89	26	24	7.5				4	2	20		1	4	5					11	17		2		30				

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
2nd Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mahanadi Mouth Paradeep	22.7.89										6								15	5				65				
do	23.7.89	30	29	7.00							1	7							10	9				76				
do	24.7.89	27	28	7.00							2		10						8	8				63				
do	25.7.89	28	29	6.5							3	12	3						9	10				22	1			
Choumuhani	25.7.89	28.5	29.5	7.00								7												6				
Mahanadi Mouth Light House side	26.7.89	29.5	29	6.5							6	15							31	11				40				
Mangrove forest	27.7.89	27	26.5	6.5							3	16							9	10				50	1			
do	28.7.89	30	29	7.5					6		11	14							23	12				70	1			
do	29.7.89	30	29	7.0															8	9				66				
do	30.7.89	30	29	7.0															8	9				66				
Muchhargaon	31.7.89	30.5	29	6.5							2	2												50				
Mahanadi mouth Light House side	1.8.89	29	28	7.0					6		3	5	2						10	12				28	5			
Devi river at Astaranga	3.8.89	28	27	6.5								10												148				
do	4.8.89	27	28.5	6.5								5												132				
do	5.8.89	30.5	27.5	6.5								9												161				

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
IIIrd Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mahanadi mouth area	3.12.89	26.5	27	6.5						2			9					9	7	4								
do	4.12.89	26	24	7						7	30								3	2				148				
do	5.12.89	24	25	7					10	9	2			2				8	23	25				3500				
Choumuhani	6.12.89	25	24	7					7	2	125													19				
Mahanadi mouth area	7.12.89	23	24	7				1	8	8	30			2				4		1				42				
Ghangolia	8.12.89	25	24	7					3										23	10							1	
Mahanadi mouth area (opp. side)	9.12.89	27	25	6.5					3	10	5	3						7						125				
Astaranga	11.12.89	27	25	7.5						3	33													33				
Devi estuary near fishing jetty	12.12.89	26.5	25	6.5						3	25							33	14	7				35				

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
IVth Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity mg/l	D.O. mg/l	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchius	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mouth of Mahanadi Paradeep	8.2.90	27	28	7.5	37168.03			7	10	7					2			3	30	60								
Mouth of Mahanadi light house side	9.2.90	27	26	7.5	21299.03				25	5	5	3			1			6	10	6	1	1		50				
Hukitola, mangrove forest	10.2.90	29	27.5	7.8	33392.53			2	30	10	2	2	14					30	11	36				43				
Ghangolia	11.2.90	28	28.5	7	28555.13				8		3		2		6				20	7				45				
Chowmuhani	12.2.90	31	29	7.5	27055.05	2.4					21	16		2				4				3		23				
Gondakula	13.2.90	32	33	7	23711.7	2.4			20		2	1						7	17	9				20				
Mouth of Mahanadi light house side	14.2.90	29	28	7	32417.83	7.1			8		1	23	2						66	20		1		50				
Near Luna bridge, Mahanadi	15.2.90	25	26	7	144.43	8.0			20		8	16												8				
Near new fishing jetty, Devi River	17.2.90	30.5	31	7.5	24295.33	7.6		1	50		3	8	8				47	14	40					11				
Near Nuagada Astaranga	19.2.90	27	26.5	6.5	3429.53	7.0			40		18	11	5		4			25	5	5				53				
Near Devi river mouth, Astaranga	20.2.89	27.5	27	7.0	16714.33	7.0		32	80		10	2	5					1	40	21		1		23				

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
Vth Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity ppt.	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion	
Hukitola	19.7.90	29	30.6	7.5	54.37				4	5			3		9				2	30				13					
Machhagaon	20.7.90	28.5	30.5	7.0	0.57					6	19													15					
Sunadhara	20.7.90	27.5	29	7.0	0.028					10	24								4					50					
Mahanadi Mouth Light House side	21.7.90	29	27.5	7.0	2.08					8			3											18	4				
do	22.7.90	29.5	28	7.0	3.06					15														30	5				
Mangrove forest, Paradeep	23.7.90	29	28	7.0	20.21				35	10			3						10	22				46				2	
do	24.7.90	29.5	28	7.0	20.21				35	13			16							24				55					
Battighara Light house	25.7.90	30	32.5	8.0	11.79					5	4													40					
Mahanadi mouth Paradeep	27.7.90	29	29.5	7.5	5.85						4		3	1	12				6	1				20					
R. Devi at Astaranga	29.7.90	31.5	32.5	7.5	0.57						10													30					

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
Vith Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity ppt.	D.O. mg/ltr	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mahanadi mouth Paradeep	16.10.90	29	24.5	7.3	1.335	63					3									7				3		1		
Opposite side Paradeep	17.10.90	31.5	29	7.0	0.108	228			50		2	3												45		1		
Sunadhara	18.10.90	29	25	6.5	0.036	55					2	30								12				8		1		
Batighar, Paradeep	19.10.90	31	29	7.5	3.25	63			50	22	4	3		18	6				2	13	3			17		1		
Hukitola Mangrove forest	20.10.90	31	29	7.5	6.06	98		20	50	7	32	18	10	37	3				3	41				31		1		
Gangolia	21.10.90	28	28	7.0	0.4	81			4										4	4				49		1		
Mahanadi mouth Paradeep	22.10.90	28	24	7.0	1.805	90			3		6								22	44				28		1		
Nuaghar, Devi river Astaranga	25.10.90	25	28.5	6.5	0.036	92.5			3		6													18		1		
Porporia Devi river	26.10.90	28	27	6.5	0.29	98.5			50		7								9					19				

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
VIIth Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity mg/lit	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion	
Saptapaniya area	22.11.90	30	28	8	1083												3		11	12				11					
Suabakunda	23.11.90	24	27	8	433.23							5							14	5				33					
Mahanadi mouth Paradeep	25.11.90	25	24	7.5	397							11						4	30	14				15					
Opposite side Paradeep	26.11.90	26.5	25.5	7.5	216.6					3	6	1						6	42	13				64					
Sunadhara Devi river	27.11.90	28.5	26	7.5	252.73							3						5	29	2				16					
Mahanadi mouth Paradeep	28.11.90	28.5	26	7.5	252.73							2						6	125	56				1					
Gangolia	29.11.90	26	27	8	1875.15							2	3					5	24	11				6					
Mahanadi Estuary middle (near creek)	30.11.90	27	26	7.5	1875.15							1						7	53	54				22					
Jumbo	1.12.90	30	28	7.5	4812.1																								

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
VIIIth Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity ppm	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mahanadi Mouth Light House side	15.3.91	32	31.5	8.0	30				10	5									5	4				24				
do	16.3.91	32	31.0	7.5	31				10	7									7	3				26				
Mangrove forest Paradeep	17.3.91	29	31.5	7.0	14			8	6	32							1		7	4		13		30	1			
do	18.3.91	30	30	7.0	15			10							22		1		5	5				40				
Battighara Light House	19.3.91	37	35	7.0	28.5			10	3						12		1		4					19				
Mahanadi Mouth Light House side	20.3.91	31	30	7.5	30				11								1		2					30				
Mangrove Forest, Paradeep	21.3.91	30	31	7.0	15.5			6	10	7		14					1		13	13				45				
do	22.3.91	29.5	30	7.0	16.5			4	10	16									4					48				
Battighara Light House	23.3.91	33	32	7.0	30										10	3	1		9					40				
do	24.3.91	32	31	7.0	31										10									41			2	

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
IXth Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity %	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mahanadi Mouth Light House side	5.3.92	32	28	7.00	27		1 lot	3			8		7											20				
Mangrove forest Paradeep	6.3.92	30	28	7.0	26			8			12		5											39				
Battighara	7.3.92	32	29	7.5	26.5				7		4	2			40				8		1			49				
Mahanadi Mouth Light house side	8.3.92	31	27	7.0	30			10			8	9												60				
Hukitola	9.3.92	32	30.5	7.5	30.5		1 lot	2			11	15	10	1				8	2	8		4		60				
Mangrove forest, Paradeep	10.3.92	31	28	7.0	10			8			9	16												90				
do	11.3.92	29.5	29	7.0	11			10			8	7	8	1					3			2		170	1		1	

**Chart Showing Physico-Chemical Parameters and Details of Specimens Collected
Xth Mahanadi Estuary Survey**

Localities	Date	Air Temp. °C	Water Temp. °C	pH	Salinity ppt	D.O.	Porifera	Cnidaria	Polychaeta	Hirudinea	Crab	Prawn	Hermit Crab	Stomatopoda	Isopoda	Amphipoda	Balanus	Insecta	Bivalvia	Gastropoda	Nudibranchus	Cephalopoda	Echinodermata	Fishes	Snakes	Plankton Sample	Xiphosura	Pseudoscorpion
Mahanadi Mouth Paradeep	8.4.92	30	35	8	21				40				3						15	4				32				
Mahanadi Mouth opp. Paradeep	9.4.92	30	34	7.5	13			18		36	20							5						150				
Batighar	10.4.92	32	35	7.5	12			25					2		15									30				
Masudia village, Malana	11.4.92	34	35	7	10			35		8	9		11		25									46				
Bahakuda Village	12.4.92	34	35	7	9					13	6											3		50				
Ghangolia	13.4.92	32	34	7.5	23			30		1	12		1											24				
Hukitola	14.4.92	30	33	7	33			35		6	80		4	3	3				4					26				

AVES

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INTRODUCTION

GENERAL FEATURES OF THE ESTUARY

Some of the important works on birds of India & Orissa were by Ali & Ripley (1-2), Ali (3), Baker & Stuart (4), Ripley (8), Whistler (11), Dev (5) & Hussain et. al. (7).

Sinha (9) has described about the geography of the river Mahanadi as well as general features of the estuary. Upadhyay (10) has studied the physico-chemical characteristic of the estuary in details and has also described some points on general features of the estuary.

OBSERVATIONS

Birds were observed and identified by using binocular. Besides estuarine zones some adjoining areas were also surveyed for observation of birds. Different localities surveyed were Paradeep (Mahanadi river mouth area, river bank near Neelachala Bazar, river bank towards Ghanagolia & bank of Luna river), Mahanadi near Chaumuhani, Perchela (Near Jambu), Chatka (Near Hukitola), Hukitola, Devi river bank near Machagaon, Devi river estuary at Astaranga (Near fishing jetty, Nuagada base & near mouth area).

SYSTEMATIC LIST

Order PELECANIFORMES

Family PHALACROCORACIDAE

1. *Phalacrocoras niger* (Vieillot)..... (Little Cormorant), Karmorant (Oriya)

Order ICONIIFORMES

Family ARDEIDAE

2. *Ardeola grayii grayii* (Sykes)(Indian Pond Heron or Paddy Bird), Baga (Oriya)
3. *Bubulcus ibis coromandus* (Boddaert)..... (Cattle Egret), Baga (Oriya)
4. *Egretta garzetta garzetta* (Linnaeus)..... (Little Egret), Baga (Oriya)

Order ANSERIFORMES

Family ANATIDAE,

5. *Tadorna ferruginea* (Pallas) (Ruddy Shelduck or Brahminy Duck),
..... Panda Hansa, Kesara Pandia (Oriya)
6. *Anas acuta* Linnaeus (Pin tail), Chunchilanjia bataka (Oriya)
7. *Anas crecca crecca* Linnaeus (Common Teal)
8. *Anas strepera strepera* Linnaeus (Gadwall), Hansa (Oriya)
9. *Aythya fuligula* (Linnaeus) (Tufted Duck), Tulas Hansa (Oriya)
10. *Nettapus coromandelianus coromandelianus* (Gmelin) (Cotton Teal), Bali Hansa (Oriya)

Order FALCONIFORMES

Family ACCIPITRIDAE

11. *Elanus caerulus vociferus* (Latham) (Black Winged Kite)
12. *Milvus migrans govinda* Sykes (Pariah Kite), Chila (Oriya)
13. *Haliaeetus leucogaster* (Gmelin) (White bellied Sea Eagle), Kurubala (Oriya)

Order GRUIFORMES

Family RALLIDAE

14. *Gallinula chloropus indica* Blyth (Indian Moorhen)

Order CHARADRIIFORMES

Family CHARADRIIDAE

Sub-family CHARADRIINAE

15. *Vanellus indicus indicus* (Boddaert) (Redwattled Lapwing), Bilati tenteyi (Oriya)
16. *Vanellus spinosus duvauceli* (Lesson) (Spur Winged Lapwing), Tenteyi (Oriya)
17. *Charadrius dubius jerdoni* (Legge) (Indian Little Ringed Plover), Batuana (Oriya)

Sub Family SCOLOPACINAE

18. *Numenius arquata orientalis* C. L. Brehm (Eastern Curlew), Gendalia (Oriya)

19. *Tringa ochropus* Linnaeus (Green Sandpiper), Kaduakhumpi (Oriya)
20. *Tringa hypoleucos* Linnaeus (Common Sandpiper), Kadua Khumpi (Oriya)
21. *Tringa totanus totanus* (Linnaeus)..... (Common Red Shank)
22. *Gallinago gallinago gallinago* (Linnaeus) (Common or Fantail snipe),
..... Chaha Chadheyi (Oriya)
23. *Calidris alba* (Pallas) (Sanderling)
24. *Calidris ruficollis* (Pallas) (Eastern Little Stint)
25. *Calidris minuta* (Leisler) (Little Stint)

Family RECURVIROSTRIDAE

26. *Himantopus himantopus himantopus* (Linnaeus)(Indian Black Winged Stilt), Stilt (Oriya)

Family GLAREOLIDAE

27. *Glareola lactea* Temminck(Small Indian Pratincole or Swallow plover)

Family LARIDAE

28. *Larus brunnicephalus* Jerdon (Brown headed Gull). Ganga Chila (Oriya)
29. *Chlidonias hybridus indicus* (Stephens) (Indian Whiskered Tern), Gangoee (Oriya)
30. *Hydroprogne caspia caspia* (Pallas)..... (Caspian Tern), Gongoee (Oriya)

Order COLUMBIFORMES

Family COLUMBIDAE

31. *Columba livia intermedia* Stickland (Indian Blue Rock Pigeon) Banua Para (Oriya)
32. *Streptopelia chinensis suratensis* (Gmelin) (Indian Spotted Dove), Kapota (Oriya)
33. *Streptopelia senegalensis cambayensis* (Gmelin) (Indian Little Brown or Senegal Dove),
..... Kapota (Oriya)

Order APODIFORMES

Family APODIDAE

Sub Family APODINAE

34. *Cypsiurus parvus batasiensis* (J. E. Gray) (Indian Palm Swift), Batasi (Oriya)

Order CORACIIFORMES

Family ALCEDINIDAE

35. *Ceryle rudis leucomelanura* Reichenbach (Indian Pied King fisher), Macharanka (Oriya)
 36. *Alcedo atthis bengalensis* Gmelin (Indian Small Blue Kingfisher), Macharanka (Oriya)

Family MEROPIDAE

37. *Merops orientalis orientalis* Latham (Indian Small Green Bee-eater),
 Mahumachi bhoji pakhi

Family UPUPIDAE

38. *Upupa epops saturata* Lonnberg (Hoopoe), Sarana (Oriya)
 39. *Hirundo daurica erythropygia* Sykes (Indian Striated or Redrumped Swallow),
 Chataka Pakhi (Oriya)

Family DICRURIDAE

40. *Dicrurus adsimilis macrocerus* Vieillot (South Indian Black Drongo or King Crow),
 Kajalapati (Oriya)

Family STURNIDAE

41. *Sturnus pagodarum* (Gmelin) (Black headed or Brahminy Myna), Bani (Oriya)
 42. *Acridotheres tristis tristis* (Linnaeus) (Indian Myna), Bani (Oriya)

Family CORVIDAE

43. *Corvus splendens splendens* Vieillot (Indian House Crow), Kaoo (Oriya)

Family MOTACILLIDAE

44. *Motacilla citreola werae* (Buturlin) (Western Yellow headed Wagtail)
 45. *Motacilla caspica caspica* (Gmelin) Grey Wagtail, Khanjana Pakhi (Oriya)

Family NECTARINIIDAE

46. *Nectarinia asiatica asiatica* (Latham) (Indian Purple Sun bird),
 Phula Madhu khia Chadheyi (Oriya)

DISCUSSION

Out of the systematic list mentioned above, all the birds are coming under Schedule IV of Indian Wild Life (Protection) Act, 1972 except Black Winged Kite, Common pariah kite, Indian moorhen, Indian Whiskered tern, Caspian tern, little stint, Red wattled lapwing, Red shank, Blue rock pigeon, small green bee eater, Hoopoe, Striated Swallow, Yellow headed Wagtail & Grey Wagtail.

As per the list of the Schedule IV of the act, killing and poaching without the licence issued by Chief Wild life Warden is prohibited.

House crow (Corvidae) is coming under schedule V of the act. Since under this schedule all are vermins, there is no any restriction of killing or poaching.

Birds are the significant indicators of the health of the environment. As different aquatic ecosystem provide food, water and shelter to birds these areas are surveyed to know the population size as well as the species composition for further applied studies. In this paper an attempt has been made to describe the systematic list of birds observed from different localities of Mahanadi estuarine zones which were probably not studied earlier.

Mangrove forests are seen in different localities of Mahanadi estuarine system which enhances the productivity. But in recent years these forests are being destroyed recklessly for different purposes. These areas are being cleared for converting them to prawn farming ponds. Further over grazing and ploughing of nearby natural grass lands responsible for destruction of birds habitat. Prawn farming or other aquaculture activities should not be encouraged in these areas. Government's programme for the promotion of water-sports, adventure tourism, wild life tourism, coastal trekking etc. in the name of tourism development should have adequate protective measures for these rare and fragile eco-system so that these beautiful feathered visitors shall feel safe to land on these areas.

SUMMARY

During the faunistic surveys conducted by the Estuarine Biological Station, Zoological Survey of India, Berhampur in the months of February and November, 1990, birds belonging to 46 species and 37 genera under 20 families and 9 orders have been observed. Details of systematic list of birds observed their common English & available Oriya names have been described in this paper.

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FISHES

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INTRODUCTION

Estuaries have long been important to mankind, both for reasons of navigation and for providing locations on their banks for towns and cities. Nowadays they are under pressure, either as repositories for the effluent of industrial process and domestic waste, or as prime sites for reclamation to create land for industry or agriculture. The estuarine environment is characterised by a constantly changing mixture of salt and fresh water, and is typically dominated by fine sedimentary material carried into the estuary from the sea and from rivers, which accumulates in the estuary to mud-flats. The mixture of salt and fresh water present challenges to the physiology of the animals to which few are able to adopt, while the mudflats are rich in food, but are low in oxygen content (Donald & Mc Luskey, 1981). The salinity of estuarine waters is between 0.5 and 35‰.

Fish populations in estuaries are abundant with of a wide diversity of species. Much of the abundance is seasonal since some marine fish move into the estuary to breed, and use the estuary as a nursery ground on which to feed and grow, before moving out to sea again. Some fishes like salmon and eels use the estuary as a migratory route from rivers to the sea and vice-versa, rarely feeding in the estuary. Only a few species live in the estuary throughout the year. Young fish utilise estuaries and near-shore marine areas as nursery areas in order to benefit from the availability of food and perhaps also to gain protection from predators (Donald, S Mc Lusky, 1981).

This paper deals with fish fauna of Mahanadi estuary which is one of the major estuaries of India. There are few sporadic works on fishes of Mahanadi estuary and probably there is no comprehensive work on fishes of this estuary. Some of the important works which deal with fish fauna of Mahanadi estuary are by David (1953), Jayaram and Majumdar (1976), Mahapatro and Venkateswarlu (1992), Shetty (1963), Shetty *et al.* (1965), Venkateswarlu and Rama Rao (1980) and Venkateswarlu *et al.* (1992, 1993 a, 1993 b, 1993 c, 1993 d, 1993 f). There is mention of fishes of this estuary in general works like Day (1875-78), Jayaram (1981), Datta Munshi and Srivastava (1988), Talwar and Kacker (1984) and Talwar and Jhingran (1991). Perhaps there is no comprehensive work on fishes of this estuary. With this view, this work has been undertaken.

Classification followed is after Nelson (1976). Under each species the original, Day's and latest synonyms were given, followed by material, distribution and remarks. Under material, date of collection, locality, total number of examples, range, registration number and name of collector were given in sequence. All the fishes were registered and kept in the collections of Estuarine Biological Station, Zoological Survey of India, Berhampur, Orissa.

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MAHANADI ESTUARY

Mahanadi with a length of 853 Km. is the longest river in Orissa and its estuary is one of the major estuaries in India. It lies in the Cuttack and Puri districts of Orissa and drains into Bay of Bengal. The tide extends to about 32 Km. from the mouth. There are two main branches of the river. The main river joins the sea at Paradeep. Another major branch river Devi joins sea near Astaranga. Both the estuaries were deep upto 40 feet. Fishing trawlers operate in the Devi estuary near Astaranga. A big fishing harbour under construction near Astaranga. Another minor branch Saharbedi joins the sea in between the two. Paradeep is about 100 Km. from Cuttack, and Astaranga is about 100 Km. from Bhubaneswar.

The Mahanadi estuarine system is spread over a wide area in the district of Cuttack and Puri, draining into Bay of Bengal at several places along a coast line of roughly 165 Km. It is located within latitudes 19°47' and 20°30' and longitudes 85°33' and 86°49'E. It extends from the northern end of Hukitola lake in the north in Cuttack district, to the north-eastern extremity of Chilka lake in the south in Puri district. At Paradeep it is joined by a major tributary from the north-west, the Nuna river. A series of estuarine creeks proceeding north-west, connect the estuary with Hukitola lake, an oblong body of brackish water covering an area of about 104 sq. km. and a width of about 8 km. at its north-eastern end. A good portion of the Mahanadi estuarine system is hardly accessible, because of the thick jungles flanking the water courses and the lack of suitable roads.

COLLECTION LOCALITIES

A brief description of the important collection localities is given below.

1. **Mahanadi mouth, Paradeep** : The mouth is situated at about 20 Km. from Paradeep town. It is approachable by road. Mouth is wide, deep about 30 feet, always open. No sand bar.
2. **Mahanadi mouth, light-house side** : This locality is on other (northern) side of the river. A light house is situated.
3. **Battighara Light House** : This is situated at about 15 km. from Paradeep and approachable only by boat, through a canal after crossing Mahanadi. There is a light house here and the canal joins Hukitola lake.
4. **Mangrove forest** : This locality is on the other (northern) side of the river. A thick mangrove forest traversed with canals.
5. **Hukitola** : This lake of 104 sq.km. is connected to the main estuary by a series of creeks. It is an oblong brackish water lake with a length of 13 km. and a width of about 8 km. at its northern end. It has a wide opening into the sea at its north-eastern end. The lake is shallow at its western and southern regions, and a good portion is exposed during low tide.
6. **R. Devi at Astaranga** : River Devi is one of the major branch of Mahanadi. Astaranga is about 9km. from Kakatpur which is about 300 km. from Paradeep and 100 km. from Bhubaneswar. There is a fishing jetty about 6 km. from Astaranga. The river is wide and

deep, about 30 feet. Trawlers operate regularly in the estuary. Mouth is about 10 km. from here.

7. **Sunadhara** : This locality is about 10 km. from Machhagaon, on the bank of river Devi. River Devi forms a loop and this locality is on northern side of loop.
8. **R. Saharbedi at Poddampur** : This is about 20 km. from Machhagaon. R. Saharbedi is a minor branch of Mahanadi.

SYSTEMATIC LIST

Order RAJIFORMES

Suborder MYLIOBATIDOIDEI

Family DASYATIDAE

Genus *Dasyatis* Rafinesque

Dasyatis walga (Muller & Henle)

Dasyatis zugei (Muller & Henle)

Order ANGUILLIFORMES

Family ANGUILLIDAE

Genus *Anguilla* Shraw

Anguilla bicolor bicolor Mc Clelland

Family MORINGUIDAE

Genus *Moringua* Gray

Moringua arundinacea (Mc Clelland)

Moringua hodgarti Chaudhuri

Moringua raitaborua (Hamilton)

Family MURAENIDIAE

Genus *Lycodontis* Mc clelland

Lycodontis meleagris (Shaw & Nodder)

Lycodontis tile (Hamilton)

Family OPHICHTHIDAE

Genus *Muraenichthys* Bleeker

Muraenichthys macropterus Bleeker

Genus *Myrophis*

Myrophis lepturus Kotthaus

Genus *Ophichthys* Ahl

Ophichthys apicalis (Bennett)

Genus *Pisodonophis* Kaup

Pisodonophis boro (Hamilton)

Pisodonophis cancrivorus (Richardson)

Family CONGRIDAE

Genus *Uroconger* Kaup

Uroconger lepturus (Richardson)

Family MURAENESOCIDAE

Genus *Muraenesox* Mc Clelland

Muraenesox bagio (Hamilton)

Order CLUPEIFORMES

Family CLUPEDIAE

Sub-family DUSSUMIERIINAE

Genus *Dussumieria* Valenciennes*Dussumieria acuta* Valenciennes

Sub Family CLUPEINAE

Genus *Escuolosa* Whitley*Escuolosa thoracata* (Valenciennes)Genus *Sardinella* Valenciennes*Sardinella albella* (Valenciennes)*Sardinella dayi* Regan*Sardinella fimbriata* (Valenciennes)*Sardinella gibbosa* (Bleeker)

Sub Family PRISTIGASTERINAE

Genus *Ilisha* Richardson*Ilisha kampeni* (Weber & de Beaufort)*Ilisha megaloptera* (Swainson)*Ilisha melastoma* (Schneider)

Sub Family ALOSINAE

Genus *Hilsa* Regan*Hilsa (Tenualosa) ilisha* (Hamilton)

Sub Family DOROSOMATINAE

Genus *Anodontostoma* Bleeker*Anodontostoma chacunda* (Hamilton)

Family ENGRAULIDAE

Sub Family ENGRAULINAE

Genus *Stolephorus* Lecepede*Stolephorus andhraensis* Babu Rao*Stolephorus bagenensis* Hardenberg*Stolephorus commersonii* Lacepede*Stolephorus devisi* Whitehead*Stolephorus heterolobus* (Ruppell)*Stolephorus indicus* (van Hasselt)*Stolephorus insularis* Hardenberg*Stolephorus waitei* Jordan & SealeGenus *Thryssa* Cuvier*Thryssa dussumieri* (Valenciennes)*Thryssa malabarica* (Bloch)*Thryssa mystax* (Schneider)*Thryssa setirostris* (Broussonet)*Thryssa vitrirostris* (Gilchrist & Thompson)

Order SILURIFORMES

Family BAGRIDAE

Genus *Mystus* Scopoli*Mystus gulio* (Hamilton)*Mystus vittatus* (Bloch)

Family ARIIDAEGenus *Arius* Valenciennes)*Arius gagora* (Hamilton)*Arius maculatus* (Thunberg)*Arius tenuispinis* Day**Family PLOTOSIDAE**Genus *Plotosus* Lacepede*Plotosus canius* Hamilton

Order MYCTOPHIFORMES

Family SYNODIDAEGenus *Saurida* Valenciennes*Saurida micropectoralis* Shindo & Yamda*Saurida tumbil* (Bloch)

Order GADIFORMES

Family BREGMACEROTIDAEGenus *Bregmaceros* Thompson*Bregmaceros maccllellandi* Thompson

Order SYNGNATHIFORMES

Family SYNGNATHIDAEGenus *Ichthyocampus* Kaup*Ichthyocampus carce* (Hamilton)Genus *Microphis* Kaup*Microphis cuncalus* (Hamilton)*Microphis deocata* (Hamilton)**Family BATRACHOIDIDAE**Genus *Austrobatrachus**Austrobatrachus dussumieri* (Valenciennes)

Order ATHERINIFORMES

Suborder EXOCOETOIDEI

Family HEMIRHAMPHIDAEGenus *Hemirhamphus* Cuiver*Hemirhamphus far* (Forsk.)Genus *Hyporhamphus* Gill*Hyporhamphus limbatus* (Valenciennes)Genus *Rhynchorhamphus* Fowler*Rhynchorhamphus malabaricus* Collette**Family BELONIDAE**Genus *Strongylura* Van Hasselt*Strongylura leiura* (Bleeker)*Strongylura strongylura* (van Hasselt)

Order SCORPAENIFORMES

Suborder PLATYCEPHALOIDEI

Family PLATYCEPHALIDAEGenus *Platycephalus* Bloch*Platycephalus bengalensis* Visweswara Rao*Platycephalus indicus* (Linnaeus)

Platycephalus scaber (Linnaeus)

Family SCORPAENIDAE

Genus *Minous*

Minous monodactylus (Bloch and Schneider)

Family SYNANCEIDAE

Genus *Polycaulis*

Polycaulis uranoscopus (Bloch and Schneider)

Genus *Apistus*

Apistus carinatus (Bloch & Schneider)

Genus *Amblyapistus*

Amblyapistus taenionotus (Cur. ed Vol.)

Order PERCIFORMES

Suborder PERCOIDEI

Family CENTROPOMIDAE

Genus *Lates* Cuvier

Lates calcarifer (Bloch)

Family AMBASSIDAE Cuvier

Genus *Ambassis*

Ambassis commersoni Cuvier

Ambassis dayi Bleeker

Ambassis dussumieri Cuvier

Ambassis gymnocephalus (Lacepede)

Family SERRANIDAE

Genus *Epinephelus* Bloch

Epinephelus malabaricus (Schneider)

Promicrops lanceolatus (Bloch)

Family TERAPONIDAE

Genus *Terapon* Cuvier

Terapon jarbua (Forsk.)

Terapon theraps Cuvier

Family URANOSCOPIDAE

Genus *Ichthyoscopus*

Ichthyoscopus inermis Cuvier

Family SILLAGINIDAE

Genus *Sillaginopsis* Gill

Sillaginopsis panijus (Hamilton)

Genus *Sillago* Cuvier

Sillago chondropus (Bleeker)

Sillago maculatus Quoy & Gaimard

Sillago sihama (Forsk.)

Family CARANGIDAE

Genus *Alepes* Swai

Alepes djedaba (Forsk.)

Alepes para (Cuvier)

Genus *Alectis* Rafinesque

Alectis indicus (Ruppell)

Genus *Atropus* Oken*Atropus atropus* (Bloch)**Genus *Carangoides* Bleeker***Carangoides malabaricus* (Bloch)**Genus *Megalaspis* Bleeker***Megalaspis cordyla* (Linnaeus)**Genus *Scomberoides* Lacepede***Scomberoides lysan* (Forsk.)*Scomberoides tala* (Cuvier)**Family LEIOGNATHIDAE****Genus *Gazza* Ruppell***Gazza minuta* (Bloch)**Genus *Leiognathus* Lacepede***Leiognathus bindus* (Valenciennes)*Leiognathus blochii* (Valenciennes)*Leiognathus brevirostris* (Valenciennes)*Leiognathus equulus* (Forsk.)*Leiognathus jonesi* James**Genus *Secutor* Gistel***Secutor insidiator* (Bloch)*Secutor ruconius* (Hamilton)**Family LUTJANIDAE****Genus *Lutjanus* Bloch***Lutjanus johni* (Bloch)**Family GERREIDAE****Genus *Gerres* Cuvier***Gerres filamentosus* Cuvier*Gerres limbatus* Cuvier*Gerres oblongus* Cuvier**Family POMADASYIDAE****Sub Family PLECTORHYNCHINAE****Genus *Plectorhynchus* Lacepede***Plectorhynchus nigrus* (Cuvier)**Sub Family POMADASYINAE****Genus *Pomadasys* Lacepede***Pomadasys argenteus* (Forsk.)*Pomadasys kakkan* (Cuvier)*Pomadasys maculatus* (Bloch)**Family SPARIDAE****Genus *Acanthopagrus* Peters***Acanthopagrus latus* (Hottuyn)**Family SCIAENIDAE****Genus *Dendrophysa* Trewavas***Dendrophysa russelli* (Cuvier)**Genus *Johnius* Bloch***Johnius volgeri* (Bleeker)

Johnius carouna (Cuvier)

Johnius carutta Bloch

Johnius coitor (Hamilton)

Family MULLIDAE

Genus *Upeneus* Cuvier

Upeneus (Pennon) tragula Richardson

Upeneus vittatus Lacepede

Family EPHIPPIDAE

Genus *Platax* Cuvier

Platax pinnatus (Linnaeus)

Family SCATOPHAGIDAE

Genus *Scatophagus* Cuvier

Scatophagus argus (Linnaeus)

Suborder MUGILOIDEI

Family MUGILIDAE

Genus *Liza* Jordan & Swain

Liza macrolepis (Smith)

Liza parsia (Hamilton)

Liza subviridis (Valenciennes)

Liza tade (Forsk.)

Genus *Mugil* Linnaeus

Mugil cephalus Linnaeus

Genus *Valamugil* Smith

Valamugil buechanani (Bleeker)

Valamugil cunnesius (Valenciennes)

Valamugil seheli (Forsk.)

Valamugil speigleri (Bleeker)

Suborder SPHYRAENOIDEI

Family SPHYRAENIDAE

Genus *Sphyraena* Rose

Sphyraena barracuda (Walbaum)

Sphyraena obtusata Cuvier

Suborder POLYNEMOIDEI

Family POLYNEMIDAE

Genus *Eleutheronema* Bleeker

Eleutheronema tetradactylum (Shaw)

Genus *Polydactylus* Lacepede

Polydactylus plebius (Broussonet)

Polydactylus sextarius (Bloch)

Suborder CALLIONYMOIDEI

Family CALLIONYMIDAE

Genus *Callionymus* Linnaeus

Callionymus fluviatilis Day

Callionymus sagitta Pallas

Suborder GOBIOIDEI

Family GOBIDAE

Sub family GOBINAE

Genus *Acentrogobius* Bleeker*Acentrogobius caninus* (C.V.)*Acentrogobius cyanomos* (Bleeker)Genus *Bathygobius* Bleeker*Bathygobius fuscus* (Ruppell)Genus *Favonogobius* Whitley*Favonogobius reichei* (Bleeker)Genus *Glossogobius* Gill*Glossogobius biocellatus* (Valenciennes)*Glossogobius giuris* (Hamilton)Genus *Oligolepis* Bleeker*Oligolepis acutipennis* (Valenciennes)Genus *Oxyurichthys* Bleeker*Oxyurichthys microlepis* (Bleeker)*Oxyurichthys tentacularis* (Valenciennes)

Sub Family APOCRYPTEINAE

Genus *Apocryptes* Valenciennes*Apocryptes bato* (Hamilton)Genus *Parapocryptes* Bleeker*Parapocryptes macrolepis* (Bleeker)Genus *Pseudapocryptes* Bleeker*Pseudapocryptes lanceolatus* (Bloch & Schneider)Genus *Boleophthalmus* Valenciennes*Boleophthalmus boddaerti* (Pallas)*Boleophthalmus sculptus* GuntherGenus *Scartelaos* Swainson*Scartelaos viridis* (Hamilton)

Sub Family PERIOPHTHALMINAE

Genus *Periophthalmodon* Bleeker*Periophthalmodon schlosseri* (Pallas)Genus *Periophthalmus* Bloch & Schneider*Periophthalmus koelreuteri* (Pallas)

Family ELEOTRIDAE

Genus *Eleotris* Schneider*Eleotris fusca* (Schneider)Genus *Prionobutis* Bleeker*Prionobutis koilomatodon* (Bleeker)

Family GOBIOIDIDAE

Genus *Brachyamblyopus* Bleeker*Brachyamblyopus brachysoma* (Bleeker)*Brachyamblyopus multiradiatus* (Hardenberg)Genus *Odontamblyopus* Bleeker*Odontamblyopus rubicundus* (Hamilton)Genus *Taeniodes* Lacepede*Taeniodes buchanani* (Day)

Taeniodes cirratus (Blyth)

Family TRYPACHENIDAE

Genus *Trypauchen* Valenciennes

Trypauchen vagina (Bloch & Schneider)

Suborder ACANTHUROIDEI

Family ACANTHURIDAE

Genus *Acanthurus* Forskal

Acanthurus pyroferus Kittlitz

Suborder SCOMBROIDEI

Family TRICHIURIDAE

Genus *Eupleurogrammus* Orill

Eupleurogrammus glossodon (Bleeker)

Genus *Lepturancanthus* Fowler

Lepturancanthus pantului (Gupta)

Suborder ANABANTOIDEI

Family ANABANTIDAE

Genus *Anabas* Cuvier

Anabas testudineus (Bloch)

Family SCOMBRIDAE

Genus *Rastrelliger* Jordan and Starks

Rastrelliger kanagurta (Cuvier)

Genus *Scomberomorus* Lacepede

Scomberomorus guttatus (Bloch & Schneider)

Family ARIOMMIDAE

Genus *Ariomma* Jordan & Snyder

Ariomma indica (Day)

Family STOMATEIDAE

Genus *Pampus* Bonaparte

Pampus chinensis (Euphrasen)

Suborder CHANNOIDEI

Family CHANNIDAE

Genus *Channa* Scopoli

Channa punctata (Bloch)

Order PLEURONECTIFORMES

Suborder PLEURONECTOIDEI

Family BOTHIDAE

Genus *Pseudorhombus* Bleeker

Pseudorhombus arsius (Hamilton)

Pseudorhombus dupliciocellatus Regan

Suborder SOLEIOIDEI

Family CYNOGLOSSIDAE

Genus *Cynoglossus* Hamilton

Cynoglossus bilineatus (Lacepede)

Cynoglossus itinus (Snyder)

Cynoglossus lingua Hamilton

Cynoglossus puncticeps (Richardson)

Genus *Paraplagusia* Bleeker

Paraplagusia bilineata (Bloch)

Paraplagusia blochii (Bleeker)

Family SOLEIDAE

Genus *Euryglossa* Kaup

Euryglossa orientalis (Bloch)

Genus *Synaptura* Cantor

Synaptura albomaculate Kaup

Synaptura commersoniana (Lacepede)

Genus *Solea* Quensel

Solea elongata Day

Solea ovata Richardson

Order TETRAODONTIFORMES

Family TRIANCANTHIDAE

Genus *Triacanthus* Cuvier

Triacanthus biaculeatus (Bloch)

Triacanthus brevirostris Schlegel

Family TETRAODONTIDAE

Genus *Chelonodon* Muller

Chelonodon fluviatillis (Hamilton)

Genus *Lagocephalus* Swainson

Lagocephalus lunaris (Bloch & Schneider)

Genus *Takifugu* Abe

Takifugu oblongus (Bloch)

SYSTEMATIC ACCOUNT

Grade PISCES

Class CHONDRICHTHYES

Order RAJIFORMES

Suborder MYLIOBATIDOIDEI

Family DASYATIDAE

Genus *Dasyatis* Rafinesque

Dasyatis walga (Muller & Henle)

1841. *Trygon walga* Muller & Henle, *Syst Besch. Plagiost* 159, Pl. 51, Fig. 1 (Type-locality : India, Red Sea).
 1878. *Trygaon walga* : Day, *Fishes of India* : 738, Pl. 194, Fig. 3.
 1989. *Traygon walga*; Day, *Fauna Brit. India, Fishes*, 1 : 55.
 1984. *Dasyatis walga*; Talwar and Kacker, *Comm. Sea Fish. India*; 100.

Common Names : Scaly sting ray Telegu Isacurrah tenkee, Tenkee sindrake, Thirachi.

Material : 18.3.1991, Mangrove Forest, Paradeep, 1 ex., F. 599. T.V.

Diagnosis : No membrenous fold along tail posterior to spine. Two buccal processes (Papillae) on floor of mouth. Tail less than 1.5 times length of disc. Disc longer than broad. Eye 3.3 in inter-orbital width. Uniform small tubercles on inter-orbital, inter-spiracle and mid dorsal surface of disc. A series of small spines between root of tail and caudal spine.

Distribution : The Red Sea, India, Sri Lanka, through the East Indies to China.

Remarks : This is common on Kerala coast.

***Dasyatis zugei* (Muller & Henle)**

1841. *Trygon zungei* Muller & Henle *Syst. Besch. Plagiost* 165, Pl. 54 (Type-locality : Pondichery; India; China; and Japan).
 1878. *Tygon zugei* : Day, *Fishes of India*; 739, pl. 190, Fig. 3.
 1991. *Dasyatis zugii* : Talwar and Jhingran, *Inland Fishes*, 2 : 40-41, Fig. 17.

Common Names : Pale-edged sting ray.

Material : 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 270.0 mm TL, F.630, T.V.

Diagnosis : Tail with both dorsal and ventral cutaneous folds. Floor of mouth without buccal process disc plain dusky brown.

Distribution : Indo-West Pacific.

Remarks : Average size about 18 cm. across the disc.

Order ANGUILLIFORMES

Family ANGUILLIDAE

Genus *Anguilla* Shraw

***Anguilla bicolor bicolor* Mc Clelland**

1844. *Anguilla bicolor* Mc Clelland, *Calcutt J. nat. Hist.*, 5 (8):178, pl.6, Fig. 1. (type-locality : India).
 1878 *Anguilla bicolor* : Day, *Fishes of India* : 660, pl. 167, Fig. 3 and plate 168, Fig.2.
 1991. *Anguilla bicolor bicolor*: Talwar and Jhingran, *Inland Fishes*, 1 : 75.

Common Names : Short fin eel (Eng.)

Material : 23.7.90, Mangrove forest near Paradeep, 1 ex., 530 mm., F.594, T.V.

Diagnosis : Scales minute, embeded in skin pectoral fins present. Dorsal and caudal fins well developed. Dorsal fin inserted over anus. Plain colouration.

Distribution : East Africa to Pakistan, India and Sri Lanka.

Remarks : It attains 100 cm.

Family MORINGUIDAE

Genus *Moringua* Gray

Moringua arundineacea (Mc Clelland)

1844. *Ptyobranchus arundinaceus* Mc Clelland, *Calcutta J. nat. Hist.*, 5 (8): 200 (Type-locality : Bengal)
1878. *Moringua raitaborua* : Day (*Partim*) *Fishes of India* : 666.
1991. *Moringua arundinacea* : Talwar and Jhingran *Inland Fishes*, 2 : 76-77.

Common Names : Bengal spaghetti eel (Eng.).

Material : 23.3.91, Battighara Light house, Paradeep, 1 ex., F.697, T.V.; 11.4.92, Bhattighara light house, Paradeep, 7 exs., F. 713, CANR.; 23.2.90, Saptapassiya and Shalakuda, Ashtaranga Devi River, 1 ex., 240 mm. DSM.

Diagnosis : Head not conspicuous from rest of body; occipital crust not elevated nor prominent; body slender, its depth 47 to 50 times in total length; head shorter, its length 10 to 12 times in total length; colour coppery or olive above, silvery below.

Distribution : Gangetic estuary and Bangladesh.

Remarks : It attains 65 cm. This is a new record from Mahanadi estuary.

Moringua hodgarti Chaudhuri

1913. *Moringua hodgarti* Chaudhuri, *Rec. Indian Mus.*, 8 (3):255, pl.9.Fig.3a, 3b (type-locality : Upper Rotung, Abor Hills, Assam).
1991. *Moringua bodgarti* : Talwar and Jhingran, *Inland Fishes*, 1 : 77.

Common Names : Indian spaghetti eel (Eng.).

Material : 23.11.90, Battighara light house, Paradeep, 1 ex., F. 708, T.V.; 23.11.90, Saptapassiya and Shalakuda, Ashtaranga, Devi River, 1 ex., 3.00 mm TL., DSM.

Diagnosis : Head conspicuous from rest of body; occipital crest elevated and prominent; colour muddy grey, ventral side lighter.

Distribution : Abor Hills, Assam.

Remarks : It attains 22 cm. it is first record from Mahanadi estuary.

***Moringua raitaborua* (Hamilton)**

1822. *Muraena raitaborua* Hamilton, *Fishes of Ganges* : 25, 364 (type-locality : Ganges river, India).
 1878. *Moringua raitaborua* : Day (Partim), *Fishes of India* : 666, pl. 170, Fig.3.
 1991. *Moringua raitaborua* : Talwar and Jhingran, *Inland Fishes, 1* : 77-78.

Common Names : Purpls spaghetti eel (Eng.)

Material : 11.4.92, Battighara light house, Paradeep, 13 exs., F. 712, CANR.

Diagnosis : Head not conspicuous from rest of body; occipital crest not elevated nor prominent; Depth of body 31 to 45 times in total length; head length 8 to 10 times of total length, colour coppery, olive or purple above, becoming silvery below;

Distribution : Gangetic estuary and Bangladesh.

Remarks : It grows to 30 cm. This is new record from this area.

Family MURAENIDAE

Genus *Lycodontis* Mc Clelland

***Lycodontis meleagris* (Shaw & Nodder)**

1795. *Muraena meleagris* Shaw and Nodder, *Naturalists' Miscellaney, 7* : pl. 299 (type-locality : Pacific Ocean).
 1878. *Muraena meleagris* : Day, *Fishes of India* : 668.
 1984. *Lycodontius meleagris* : Talwar and Kacker, *Comm. Sea Fish. India* : 225-226.

Common Names : Spotted Moray (Eng.).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., F.567, T.V.; 19.10.91, Mouth of Mahanadi, light house side, Paradeep, 2 exs., F.597, CANR.

Diagnosis : Teeth in upper jaw in 2 rows, the inner row of at-least length 1.7 to 2.9 times in trunk; body black with numerous small yellow spots, more crowded on head and body and sparse on tail. Tip of tail yellow or orange.

Distribution : Indo-West Pacific.

Remarks : Normally it is used as bait in long-line fishing.

***Lycodontis tile* (Hamilton)**

1822. *Muraenophis tile* Hamilton, *Fishes of Ganges* : 18, 363 (type-locality : Ganges estuaries near Calcutta).
 1878. *Muraena tile* : Day, *Fishes of India* : 668, pl. 170, Fig.4.
 1991. *Lycodontis tile* : Talwar and Jhingran, *Inland Fishes, 1* : 79.

Common Names : Fresh water Moray (Eng.).

Material : 23.7.90, Mangrove Forest near Paradeep, 1 ex., 55.0 mm, TL, F.593, T.V.; 16.3.91, Mouth of Mahanadi, Light house side Paradeep, 1 ex., 310.0 mm, TL, F.601, T.V.; 24.3.91, Mouth of Mahanadi, Light house side, Paradeep, 1 ex., F.695, T.V.; 23.10.90, Saptapassiy area and Shalikada Ashtaranga, Devi River, 1 ex., F. 350. DSM.

Diagnosis : Cleft of mouth 3.8 to 4.2 times in head length; head length 3 times or some what less in trunk; body brownish-yellow to greenish, with white specks (often absent in adults). Teeth in 2 rows.

Distribution : India, East Indies, Phillipines and Hawaii.

Remarks : It grows to 60 cm.

Family OPHICHTHIDAE

Genus *Muraenichthys* Bleeker

Muraenichthys macropterus Bleeker

Material : 13.2.89, Devi river near Sonadhara, 1 ex., 165.0 mm, F.368, T.V.

Diagnosis : Posterior nostril opens into mouth; covered by an exterior valvular flap, two pores between nostrils. Pectoral fins absent, caudal fin present, confluent with dorsal and anal fins. Tail fin flexible.

Genus *Pisodonophis* Kaup

Pisodonophis boro (Hamilton)

1822. *Ophisurus boro* Hamilton, *Fishes of Ganges* : 20, 363, pl.5, Fig.5(type-locality:Hooghly near Calcutta).

1878. *Ophichthys boro* : Day, *Fishes of India* : 664, pl. 171, Fig.2.

1991. *Pisodonophis boro* : Talwar and Jhingran, *Inland Fishes, 2* : 86-87.

Common Names : Rice – Paddy eel. Bengal's snake eel. (Eng.).

Material : 21.2.89, Devi river near Ashtharanga, 2 exs., 111-121 mm, F.576, T.V.; 23.3.91, Battighara light house, Paradeep, 3 exs., F.698, T.V.; 23.11.90, Saptapasiya area & Shalekude, Ashtaranga Devi river, 3 exs., 184-194 mm. DSM.

Diagnosis : Body snake like, dorsal fin origin about a pectoral fin length behind tips of pectrol fins.

Distribution : Into-West Pacific.

Remarks : It attains 70 cm.

Pisodonophis cancrivorus (Richardson)

1844. *Ophisurus cancrivorus* Richardson, *Voy, Erebus and Terror, Fish* : 97, 50, Figs. 6-9 (type-locality : Singapore).
 1916. *Ophichthus chilensis* Chaudhuri, *Mem. Indian Mus.*, 5 (5):445, Figs. 12, 13.
 1991. *Pisodonophis cancrivorus* : Talwar and Jhingran, *Inland Fishes*, 2 : 87.

Common Names : Longfin snake eel (Eng.).

Material : 23.7.90, Mangrove forest near Paradeep, 1 ex., 535 mm, F.595., T.V.; 16.3.91, Mouth of Mahanadi near light house side, Paradeep, 1 ex., 440 mm, F.596, T.V.

Diagnosis : Dorsal origin above base of middle portion of pectoral fin; body snake-like; extreme tip of tail stiff and finless.

Distribution: Into-West Pacific.

Remarks : It attains 50 cm.

Genus ***Ophichthys*** Ahl***Ophichthys apicalis*** (Bennett)

1830. *Ophichthus apicalis* Bennett, *Cat. Zool. Spec. in Mem. Life of Raffles* : 692 (Type-locality : Java).
 1984. *Ophichthys apicalis* : Talwar and Kacker, *Comm. Sea Fish India*; 246-247.

Common Names : Pointed-tail snake eel. (Eng.).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., F. 560, T.V.; 16.3.91, Mouth of Mahanadi, light house side, Paradeep, 6 exs., F.626, T.V.; 17.3.91, Mangrove forest at Paradeep, 1 ex., 770 mm, F.492, T.V.

Diagnosis : Dorsal fin origin behind pectoral fin base; Teeth in upper jaw in single row on sides of jaw; snout rather blunt; dorsal and anal fins expanded near end of tail.

Distribution : Indo-Pacific.

Genus ***Myrophis*** Lutken***Myrophis lepturus*** Kotthaus

Material : 11.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 127.0 mm, F.387, T.V.

Family CONGRIDAE

Genus *Uroconger* Kaup*Uroconger lepturus* (Richardson)

1845. *Conger lepturus* Richardson, *Zool. Voy. Sulphur* : 106, pl. 56, Fig. 1-6 (type-locality : Canton, China).
 1878. *Uroconger lepturus* : Day, *Fishes of India*, 661, pl. 170, Fig. 1.
 1984. *Uroconger lepturus* : Talwar and Jhingran, *Comm. Sea Fish, India*: 232-233.

Common Names : Slender conger eel. (Eng.).

Material : 11.3.92, Mangrove forest near Paradeep, 1 ex., 241.00 mm TL, F.742, T.V.

Diagnosis : Body elongate and cylindrical, becoming narrower posteriorly on tail which is remarkably tapering to a point; tail usually longer, twice length of head and trunk combined; snout broad, blunt projecting in front of lower jaw; Teeth in 2 rows on sides of jaws, canine-like; premaxillary patch of teeth almost exposed on a lower surface of tip of snout when mouth is closed; dorsal fin origin above or slightly before pectoral-fin base; lateral line conspicuous with a row of whitish spots; fins darker.

Distribution : Indo-West Pacific.

Family MURAENESOCIDAE

Genus *Muraenesox* Mc Clelland*Muraenesox bagio* (Hamilton)

1822. *Muraena bagio* Hamilton, *Fishes of Ganges*: 364 (type-locality : Ganges estuary).
 1878. *Muraenesox cinereus* : Day (*Partim*), *Fishes of India* : 662.
 1991 *Muraenesox bagio* : Talwar and Kacker, *Inland Fishes, 1* : 91-92, Fig. 31.

Common Names : Common pike-conger eel. (Eng.).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 209-440 mm, F.344, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 6 exs., F.346, T.V.; 19.2.89, Mouth of Mahanadi, light house side, Paradeep, 1 ex., 522.0 mm, F.400, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 606.0 mm. F.340, T.V.; 20.2.90, Devi river near Ashtaranga, 1 ex., 210 mm, F.717, CANR.; 9.3.92, Hukitola, Paradeep, 300-340 mm., F.696, T.V.; 23.2.90, Saptapasiya Devi River, 2 exs., 320-410 mm. T.V.

Diagnosis : Inter-orbital width about 10.7 times in length of head; lateral line porus before level of anus 33 to 39, dorsal fin rays before a vertical at anus 47 to 59. Largest teeth on lower jaw laterally compressed, sharp and erect.

Distribution : Indo-West Pacific.

Remarks : Grows upto 15 cm.

Order CLUPEIFORMES

Family CLUPEIDAE

Subfamily DUSSUMIERINAE

Genus *Dussumieria* Valenciennes,*Dussumieria acuta* Valenciennes

1847. *Dussumieria acuta* Valenciennes, *Hist. nat. Poiss.*, 20 : 467, pl. 606 (type-locality : Bombay, Coromondal).
 1878. *Dussumieria acuta* : Day, *Fishes of India*, 647, Pl. 166, Fig. 4.
 1984. *Dussumieria acuta* : Talwar and Kacker, *Comm. Sea Fish. India* : 129-130, Fig.43.

Common Names : Rainbow Sardine (Eng.); Marrawa, Morava (Telugu).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 ex., F.525, T.V.; 21.3.91, Mangrove forest near Paradeep, 2 exs., 63-64 mm, F.647, T.V.; 22.3.91, Mangrove forest near Paradeep, 1 ex., 71 mm., T.V.

Diagnosis : Branchiostegal rays 11 to 18; no abdominal scutes (except for plate-like W-shaped pelvic scute) Belly smooth. Maxilla not quite reaching anterior eye border., pre-maxilla not quite reaching anterior eye border., pre-maxilla rectangular giving distinctive appearance to mouth.

Distribution : Indo-Pacific.

Remarks : This contributes good fishing in Andhra and Tamilnadu coasts.

Subfamily CLUPEINAE

Genus *Escualosa* Whitley*Escualosa thoracata* (Valenciennes)

1847. *Kowala thoracata* Valenciennes, *Hist. nat. Poiss.*, 20 : 363 (type-locality : Pondichery).
 1984. *Escualosa thoracata* : Talwar and Kacker, *Comm. Sea Fish. India*, 133-134, Fig. 45.

Common Names : White sardine (Eng.); Kavallu (Telugu).

Material : 12.2.89, Mahanadi mouth at Paradeep, 2 exs., 50-55 mm., F.311, T.V.; 14.2.89, Mahanadi mouth at Paradeep, 2 exs., 54-58 mm, F.590, T.V.; 15.2.89, Mahanadi mouth at Paradeep, 1 ex., 57.0 mm, F.294, T.V.; 18.2.89, Mahanadi mouth at Paradeep, 1 ex., 50 mm, F.586, T.V.; 19.2.89, Mahanadi mouth light house side, 4 exs., 50-63 mm, F.397, T.V.; 19.2.89, Mahanadi mouth at Paradeep, 5 exs., F.413, T.V.; 20.2.89, Mahanadi mouth at Paradeep 20 exs., 12 exs., 48-57 mm, 8 exs., 48-63 mm, F.362 and F. 453, T.V.; 16.3.91, Mahanadi mouth at light house side, 2 exs., 65.0-80.00 mm, F. 614, T.V.; 21.3.91, Mangrove Forest at Paradeep, 6 exs., 51.0-74.0 mm, F.655, T.V.

Diagnosis : Gill openings smoothly rounded with no dermal outgrowths; Two supra maxilla, the second supra maxilla large and rectangular. Pelvic fin with 7 rays; silvery lateral stripes along flanks of body.

Distribution : Pakistan, India, Sri Lanka, Indo-Malayan Archipelago to Australia.

Remarks : The large and rectangular second supra maxilla is a specific character separating this species from similar species of *Hilsa*, *Sardinella* and *Herklotrichthys*. This species is caught mainly from the West coast of India.

Genus *Sardinella* Valenciennes

Sardinella albella (Valenciennes)

1847. *Kowala albella* Valenciennes, *Hist. nat. Poiss.*, 28 : 362 (type-locality : Pondicherry).
 1973. *Sardinella albella* : Whitehead, *J. mar. biol. Ass. India.*, 14 (1) : 183, Fig. 13.
 1984. *Sardinella abella* : Talwar and Kacker, *Comm. Sea Fish, India* : 138-139.

Common Names : White Sardinella (Eng.); Kavalley (Telugu).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 14 exs., 64-104 mm, F. 304, T.V.; 5.12.89, Mouth of Mahanadi at Paradeep, 76 exs., 38-112 mm, F.761, DSM.

Diagnosis : Post pelvic scutes 12 to 14; gill rakers 40 to 67 on lower arm of first arch; posterior scales with 4 or 5 vertical striae, interrupted at centre of scale; dorsal fin origin slightly before mid point of body; back blue-black.

Distribution : East Africa coast, Red Sea through India, East Indies to Taiwan, to Australia.

Sardinella dayi Regan

1917. *Sardinella dayi* Regan, *Ann. Mag. nat. Hist.*, (8) 19 : 381 (type-locality : Karwar, India).
 1973. *Sardinella dayi* : Whitehead, *J. mar. biol. Ass. India*, 14 (1):181, Fig. 10.
 1984. *Sardinella dayi* : Talwar and Kacker, *Comm. Sea Fish. India* : 141-142, Fig. 49.

Common Names : Day's Sardinella (Eng.).

Material : 17.3.91, Mangrove forest at Paradeep, 2 exs., 30-70 mm, F. 496, T.V.

Diagnosis : Post pelvic scutes 12 to 14; gill rakers 90 to 132 on lower arm of first arch; dorsal origin slightly nearer to tip of snout than to base of caudal fin; back bluish grey.

Distribution : India and Sri Lanka.

***Sardinella fimbriata* (Valenciennes)**

1847. *Spratella fimbriata* Valenciennes, *Hist. nat. Poiss.*, 20 : 359, pl. 601 (type-locality : Malabar).
1878. *Clupes fimbriata* : Day, *Fishes of India*, 637, pl. 161, Fig. 3.
1984. *Sardinella fimbriata* : Talwar and Kacker; *Comm. Sea Fish. India* : 142-143, Fig. 50.

Common Names : Fringescale sardinella (Eng.); Kowal (Telugu).

Material : 11.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 104-114 mm, F.384, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 74.0 mm, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 18 exs., F. 347, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 11 exs., 62-97 mm, F. 579, T.V.; 19.2.89, Mouth of Mahanadi at light house side, Paradeep, 9 exs., 63-72 mm, F.393, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 31 exs., 45-80 mm, F.402, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 18 exs., 47-75 mm, F.458, T.V.; 21.2.89, Devi river mouth seas Ashtaranga, 2 exs., F.516, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 62.0 mm, F. 320, T.V.; 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 7 exs., 44.0-57.00 mm, F.604, T.V.; 21.3.91, Mangrove forest, Paradeep, 10 exs., 56.0-65.0 mm; 22.3.91, Mangrove forest, Paradeep, 2 exs., 60-102 mm, T.V.

Diagnosis : Lower gill rakers on first arch 53-82; posterior scales with 4 or 5 vertical striae; back blue-green.

Distribution : India, Indo-Malay Archipelago, to Phillipines, New Guinea to Australia.

Remarks : Caudal fin tip dark but not got black as in *S. melanura*.

***Sardinella gibbosa* (Bleeker)**

1849. *Clupea gibbosa* Bleeker, *J. Ind. Arch.*, 3 : 72 (type-locality : Macassar).
1973. *Sardinella gibbosa* : Whitehead, *J.mar biol. Ass. India*, 14 (1):185, Fig. 15.
1984. *Sardinella gibbosa* : Talwar and Kacker, *Comm. Sea Fish. India* : 143-144.

Common Names : Goldstripe sardinella (Eng.); Kavallu (Telugu).

Material : 14.2.89, Mouth of Mahanadi at Paradeep, 7 exs., 75-90 mm, F.592, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 11 exs., 62-97 mm, F.548, T.V.

Diagnosis : Post pelvic scutes 15; lower gill rakers on first branchial arch 38 to 65; anterior scales with a few perforations and fimbriated at posterior margin; body blue green above; a narrow yellow horizontal line on body.

Distribution : East coast of Africa, Madagascar, the Red Sea, through India, the East Indies, to the Phillipines, Hongkong and Taiwan, to northern tip of Australia.

Remarks : It grows to 17 cm.

Subfamily PRISTIGASTERINAE

Genus *Ilisha* Richardson*Ilisha kampeni* (Weber & de Beaufort)

1913. *Pellona kampeni* Weber & de Beaufort, *Fishes Indo-Australian Archipelago*, 2 (type-locality : Java and Borneo).

1991. *Ilisha kampeni* : Talwar and Jhingran, *Inland Fishes*, 1 : 119.

Common Names : Kampen's ilisha (Eng.).

Material : 21.2.89, Devi river mouth near Astharanga, 1 exs., 120.0 mm, F.542, T.V.; 22.2.89, Devi river near Ashtaranga, 2 exs., 130-135 mm, F.337, T.V.,

Diagnosis : Lower gill rakers 20 to 25. Vertical striae on scales not continuous, but with a distinct gap across centre of scales. Operculum indented at level of eye. Body slender, its depth 3.1 to 4.1 times in standard length. Basal part of pseudo-branch covered by a thin membrane. Fins hyaline.

Distribution : India to Indonesia.

Ilisha megaloptera (Swainson)

1839. *Platygaster megaloptera* Swainson, *Natural History Animals*, 2 : 294 (on Jangarloo of Russel, 1803, ex Vizagapatam).

1878. *Pellona motius* : Day, *Fishes of India* : 643, pl. 165, Fig. 3.

1878. *Pellona megaloptera* : Day, *Fishes of India*; 645, pl. 165, fig. 2.

1991. *Ilisha megaloptera* : Talwar and Jhingran, *Inland Fishes*, 1 : 119-120, Fig. 46.

Common Names : Big-eye ilisha (Eng.); Jangarloo (Telugu).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 1 exs., 104 mm, F.424, T.V.

Diagnosis : Total scutes 34 to 42. Body rather deep, its depth 2.6 to 3.5 times in standard length; Dorsal fin inserted near midpoint of body. Anal fin origin below hind part of dorsal fin base.

Distribution : Indian Ocean and Java Sea.

Remarks : It grows upto 28 cm.

Ilisha melastoma (Schneider)

1801. *Clupea melastoma* Schneider, *Syst. Ichthyol.* Bloch : 427 (type-locality : Coromondal, Tamilnadu).

1878. *Pellona indica* : Day, *Fishes of India* : 644, pl. 164, Fig. 4.

1878. *Pellona brachysoma* : Day, *Fishes of India* : 645, pl. 164, Fig.2.

1991. *Ilisha melastoma* : Talwar and Jhingran, *Inland Fish.*, 1 : 121.

Common Names : Indian Ilisha (Eng.); Ditchoe (Telugu).

Material : 16.3.91, Mouth of Mahanadi, light house side, Paradeep, 2 exs., 54.0-57.0 mm, F.615, T.V.

Diagnosis : Lower gill rakers 20 to 25. Vertical striae on scales traversing whole scale or overlapping across centre of scales. Body deep, its depth 2.4 to 3 times in standard length. Pseudobranch completely exposed. Dorsal fin inserted slightly before midpoint of body.

Distribution : India, Java Sea, South China Sea and East China sea.

Remarks : It attains 17 cm.

Subfamily ALOSINAE

Genus *Hilsa* Regan

Hilsa (Tenuالosa) ilisha (Hamilton)

1822. *Clupanodon ilisha* Hamilton, *Fishes of Ganges* : 243, 383, pl. 19, Fig. 73 (type-locality : Ganges estuaries).

1878. *Clupea ilisha* : Day, *Fishes of India*, 640, pl. 172, Fig. 3.

1991. *Hilsa (Tenuالosa) ilisha* : Talwar and Jhingran, *Inland Fishes I* : 100-101, fig.35.

Common Names : Hilsa Eng. Ilish, Ilisha, Jodi (Oriya); Palasha, Polusu (Telugu).

Material : 20.2.89, Devi river near Ashtaranga, 1 ex., 101.0 mm, F.716, T.V.

Diagnosis : Upper jaw with a distinct median notch at centre. Scales moderate size, evenly arranged, 37 to 47 in lateral series; lower edge of operculum at 20° to horizontal. Head shorter, its length 3.7 to 4.5 times in standard length. Gill rakers 60 to 100 on lower arm of first arch. No spots along flanks. A dark blotch behind gill opening. Fins hyaline.

Distribution : Northern parts of Indian ocean.

Remarks : It is a migratory fish. It ascends upto 400 km in Mahanadi system. It is highly esteemed for its culinary excellence. It grows upto 50 cm.

Subfamily DOROSOMATINAE

Genus *Anodontostoma* Bleeker

Anodontostoma chacunda (Hamilton)

1822. *Clupanodon chacunda* Hamilton, *Fishes of Ganges* : 246 (type-locality : Ganges estuaries).

1878. *Chatoessus chacunda* : Day, *Fishes of India*, 632, pl. 160, Fig. 3.

1991 *Anodontostoma chacunda* : Talwar and Jhingran, *Inland Fishes, I* : 104-105.

Common Names : Chacunda giggard-shad (Eng.); Kone, Balangi, Balango (Oriya); Kome, Balango (Telugu).

Material : 13.2.89, Saharbedi river near Poddampur, 2 exs., 68-78 mm, F.447, T.V.; 21.2.89, R.Devi mouth near Ashtaranga, 1 ex., 84.0 mm, 1 ex., 82.0 mm, F.533, T.V.; 22.2.89, R.Devi Mouth near Ashtaranga, 2 exs., 81-92 mm, F.318, T.V.

Diagnosis : A median series of pre-dorsal scales; maxilla straight and thin, its tip tapering. Second supra maxilla a mere splint. Gill rakers on lower part of arch 54 to 96. Lateral line scales 38 to 45, Last dorsal fin ray not filamentous. A large black spot behind gill opening.

Distribution : Indian ocean and Western Pacific.

Remarks : It attains 20 cm.

Family ENGRAULIDAE

Subfamily ENGRAULINAE

Genus *Stolephorus* Lacepede

Stolephorus andhraensis Babu Rao

1965. *Stolephorus andharaensis* Babu Rao, *Ann. Mag. nat. Hist.* (13) 9 : 103 (type-locality : Waltair, Kakinada).
 1973. *Stolephorus andhraensis* : Whitehead, *J.Mar. biol. Ass. India*, 14 (1):224, fig. 47.
 1984. *Stolephorus andhraensis* : Talwar and Kacker, *Comm. Sea Fish. India* : 185-186, fig. 75.

Common Names : Andhra anchovy (Eng.).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 69.0 mm, F. 423, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 86-94 mm, F.551, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 1 exs., 81.0 mm, F.582, T.V.; 19.2.89, Mouth of Mahanadi at light house side, Paradeep, 3 exs., F.395, T.V.; 21.2.89, Devi river mouth at Ashtaranga, 3 exs., F.517, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 57.0 mm, F.326, T.V.; 5.12.89, Mouth of Mahanadi at Paradeep, 6 exs., 30-86 mm, F.769, D.S.M.; 26.7.90, Battighara, Paradeep, 6 exs., 50.0-70.0 mm; 16.3.91, Mouth of Mahanadi near light house side, 1 ex., 97.0 mm, F.617, T.V.; 21.3.91, Mangrove forest, Paradeep, 5 exs., 42.0-76.0 mm, F.650, T.V.; 22.3.91, Mangrove forest, Paradeep, 3 exs., 45.0-53.0 mm, T.V.

Diagnosis : Anal fin margin under dorsal-fin base, muscular portion of isthmus extending forward beyond hind margin of branchiostegal memberane; hind borders of pre-operculam indented near maxilla tip; no double pigment line on back; body slender, snout longer pointed; scutes 6 between pectoral and pelvic fins.

Distribution : East Coast of India, Singapore, Papua, New Guinea.

***Stolephorus bagenensis* Hardenberg.**

1931. *Stolephorus bagenensis* Hardenberg, *Truebia*, 13(1):107 (type-locality : Rokan R. mouth).
 1973. *Stolephorus macrops* : Whitehead, *J.mar.biol. Ass. India*, 14 (1): 223, fig. 45.
 1984. *Stolephorus bagenensis* : Talwar and Kacker, *Comm. Sea. Fish, India*. 186-187, fig. 76.

Common Names : Spined anchovy (Eng.).

Material : 21.2.89, Devi river mouth near Astharanga, 2 exs., 84-106 mm, F. 534, T.V.

Diagnosis : Hind border pre-operculum evenly rounded near maxilla tip; 7 needle-like scutes between pectoral and pelvic fin; a distinctive spine on pelvic scute between fin bases; gill rakers on lower arm of first arch 18 to 24; bright silvery stripe on flanks; a double line of small pigment spots on back behind dorsal fin.

Distribution : North east coast of India, the Indo-Malayan Archipelago.

***Stolephorus commersonii* Lacepede**

1803. *Stolephorus commersonii* Lacepede, *Hist. nat. Poiss.*, 5 : 381, 382, pl. 12, fig.1. (type-locality : Macritius).
 1878. *Engraulis commersonianus* : Day, *Fishes of India* : 629, pl. 158, fig. 1.
 1984. *Stolephorus commersonii* : Talwar and Kacker, *Comm. Sea. Fish. India* : 188-189, fig. 78.

Common Names : Commerson's anchovy (Eng.); Churali-patua (Oriya); Purasa, Kelba (Telugu).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 95-96 mm, F. 313, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 87-91 mm, F. 464, T.V.

Diagnosis : No pre dorsal spine; no spines on pelvic scute; maxilla tip reaching to or beyond posterior border of pre-operculum; pelvic fin tips reaching well past vertical from dorsal fin origin; a pair of dark pre-dorsal lines on back.

Distribution : East Coast of Africa, India, Indo-Malayan Archipelago, and the Philippines to Samoa.

Remarks : Grows to 13 cm.

***Stolephorus devisi* Whitehead**

1973. *Stolephorus devisi* Whitehead, *J. mar.biol. Ass. India*. 14 (1) : 221, fig. 43.
 1984. *Stolephorus devisi* : Talwar and Kacker, *Comm. Sea Fish. India* : 189-190, fig. 79.

Common Names : Devis's anchovy (Eng.).

Material : 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 43.0 mm, F.359, T.V.

Diagnosis : Maxilla pointed posteriorly projecting beyond anterior border of operculum; urohyal plate bony; gill rakers 21 to 26 on lower arm of first unbranched arch; dorsal and anal rays 3; silvery stripe along flanks.

Distribution : East coast of Africa, Red Sea, India, Indo-Malayan Archipleago to Japan and Queensland.

***Stolephorus heterolobus* (Ruppell)**

1837. *Engraulis heterolobus* Ruppell, *New. Wirbelth. Fische* : 79, pl.21, fig.4 (type-locality : Red sea).

1973. *Stolephorus heterolobus* Whitehead, *J.mar. biol. Ass. India*, 14 (1):220, fig. 42.

1984. *Stolephorus heterolobus* : Talwar and Kacker, *Comm. Sea. Fish. India* : 190-191, fig. 80.

Common Names : Shorthead anchovy (Eng.).

Material : 16.3.91, Mouth of Mahanadi near light house side, Paradeep, 3 exs., 57.0-60.0 mm, F.621, T.V.

Diagnosis : Gill rakers 23 to 29 on lower arm of first arch; unbranched dorsal and anal rays 2; maxilla pointed posteriorly, projecting beyond anterior border of pre-operculum; urohyal bony plate.

Distribution : East coast of Africa, Red Sea, India, Indo-Malayan Archipleago to Japan and Queensland.

***Stolephorus indicus* (Van Hasselt)**

1823. *Engrulis indica* Van Hasselt, *Algemeene Korst-en letterbode*, 1 (23):329 (type-locality : Java).

1878. *Engraulis indicus* : Day, *Fishes of India* : 191-192, fig. 81.

Common Names : Indian anchovy (Eng.); Nattoo (Telugu).

Material : 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 2 exs., 65.0-70.0 mm, F.610, T.V.

Diagnosis : No predorsal spines, no spine on pelvic scute; maxilla tip reaching to or only just beyond anterior border of pre-operculum; pelvic fin tips failing to reach vertical from dorsal fin origin; pre-pelvic scutes 3 to 5.

Distribution : Indo-Pacific.

***Stolephorus insularis* Hardenberg**

1933. *Stolephorus insularis* Hardenberg, *Natuurk. Tijdschr. Ned. Indie* : 93 (2):260 (type-locality : Java).
 1984. *Stolephorus insularis* : Talwar and Kacker, *Comm. Sea, Fish India* : 192-193, fig. 82.

Common Names : Hardenberg anchovy (Eng.)

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 3 exs., 43-47 mm, F.315, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 45-47 mm, F.468, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 1 exs., F.511, T.V.; 16.3.91, Mouth of Mahanadi at light house side, 9 exs., 43.0-55.0 mm, F.619, T.V.; 22.3.91, Mangrove forest, Paradeep, 1 exs., 58 mm, T.V.

Diagnosis : 5 to 7 needle like pre-pelvic scutes; maxilla tip projecting beyond anterior border of pre-operculum; gill rakers on lower arm of first arch 20 to 24; two thin pigmented lines along back.

Distribution : Gulf of Eden, India, Indo-Malayan Archipelago and Taiwan.

***Stolephorus waitei* Jordan & Seale**

1926. *Stolephorus waitei* Jordan and Seale, *Bull. Mus. Comp. Zool. Harvard*, 67 (11): 380 (type-locality : Queensland).
 1984. *Stolephorus waitei* : Talwar and Kacker, *Comm. Sea Fish. India* : 193-194, fig.83.

Common Names : Batavian anchovy (Eng.)

Material : 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 3 exs., 35.0-44.0 mm, F.622, T.V.

Diagnosis : Maxilla tip reaching to or beyond posterior border of pre-operculum; pelvic fin tip not reaching to vertical from dorsal fin origin; no dark lines on back; black dots below eye and on tip of lower jaw.

Distribution : India, Indo-Malayan Archipelago, the Philippines and Taiwan.

Genus *Thryssa* Cuvier***Thryssa dussumieri* (Valenciennes)**

1848. *Engraulis dussumieri*, *Hist. nat. Poiss.*, 21 : 29 (type-locality : Arabian Sea).
 1878. *Engraulis dussumieri* : Day, *Fishes of India* : 627, pl. 158, fig. 4.
 1991. *Thryssa dussumieri* : Talwar and Jhingran, *Inland Fishes*, 2: 143-144.

Common Names : Dussumier's thryssa (Eng.).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 96.0 mm, F.375, T.V.

Diagnosis : Gill rakers 17 to 19 on lower arm of first arch; maxilla reaching at least half way along pectoral fin (of even to pelvic fin base); back bluishgreen; a dark blotch behind upper part of gill opening.

Distribution : Pakistan, India, Sri Lanka, Burma and Western Pacific.

***Thryssa malabarica* (Bloch)**

1795. *Clupea malabaricus* Bloch, *Naturges. ausland. Fische*, (9):115, pl.432 (type-locality : Tranqubar, Tamil Nadu).
 1878. *Engraulis malabaricus* : Day, *Fishes of India*, 2 : 146.
 1991 *Thryssa malabarica* : Talwar and Jhingran, *Inland Fishes*, 2 : 146.

Common Names : Malabar thryssa (Eng.); Poorwa, Purava (Telugu)

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 94.00 mm, F.427, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 110.0 mm, F.322, T.V.; 17.3.91, Mangrove forest near Paradeep, 1 ex., 115.0 mm, F.494, T.V.

Diagnosis : Gill rakers 17 to 19 on lower arm of first arch; anal fin rays 38 to 43; a dark blotch behind gill opening; body deeper; its depth 2.7 to 2.9 times in standard length; small spots on cheek, gill cover, maxilla and paired fins.

Distribution : Pakistan, India and Srilanka.

***Thryssa mystax* (Schneider)**

1801. *Clupea mystax* Schneider, *Syst. Ichthy. Bloch* : 426, pl.83, (type-locality : Malabar).
 1878. *Engraulis mystax* : Day, *Fishes of India* : 625, pl. 157, Fig. 3.
 1984. *Thyssa mystax* : Talwar and Kacker, *Comm. Sea. Fish. India*. 201-202, fig.89.

Common Names : Moustached thryssa (Eng.); Phasa (Oriya); Nedum-poruva (Telugu).

Material : 10.2.89, 1 ex., Mouth of Mahanadi at Paradeep, 97.00 mm, F.432, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 5 exs., 74-106 mm, F.457, T.V.

Diagnosis : Anal fin with 29 to 37 branched rays; mouth nearly horizontal; pre-pelvic scutes 16 to 20; mouth-tip on level of eye centre; maxilla long, its tip pointed and reaching to or beyond pectoral fin base; a dark area on shoulder.

Distribution : India, Sri Lanka and the East Indies.

Remarks : Grows to 21 cm.

***Thryssa setirostris* (Browssonet)**

1782. *Clupea setirostris* Browssonet, *Ichthyol.* (type-locality : Pacific Ocean near Tanna Island).
 1878. *Engraulis setirostris* : Day, *Fishes of India* : 626.

1984. *Thryssa setirostris* : Talwar and Kacker, *Comm. Sea. Fish. India* : 204-205, fig.91.

Common Names : Longjaw thryssa (Eng.); Yeka-poorawah (Telugu).

Material : 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 100.0 mm, F.461, T.V.; 16.3.91, Mouth of Mahanadi near light house side, Paradeep, 1 ex., 122.0 mm, F. 612, T.V.

Diagnosis : Lower jaw with high coronoid process; maxilla (upper jaw) very long, extending to beyond pectoral-fin tip; faint area at shoulder.

Distribution : Indo-pacific.

Remarks : The very long maxilla make this species unmistakable.

Thryssa vitrirostris (Gilchrist & Thompson)

1908. *Engraulis vitrirostris* Gilchrist and Thompson, *Ann. S. Afr. Mus.*, 6 : 201 (type-locality : Durban, Netal).

1973. *Thryssa vitrirostris* : Whitehead, *J. Mar. biol. Ass. India.*, 14 (1):233, fig. 57.

1984. *Thryssa vitrirostris* : Talwar and Kacker, *Comm. Sea Fish. India*, 205-206, fig.92.

Common Names : Ganges mouth thryssa (Eng.); Nedu poruva (Telugu).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., F.554, T.V.

Diagnosis : Post pelvic scutes 8 to 12; maxilla reaching to 1/3 of pectoral fin; anterior supra maxilla present; gill rakers on lower arm of first arch 18 to 24; dark area on shoulder; gill cavity bright orange.

Distribution : Coasts of India and west-ward to the East African Coast.

Order SILURIFORMES

Family BAGRIDAE

Genus *Mystus* Scopoli

Mystus gulio (Hamilton)

1822. *Pimelodus gulio* Hamilton, *Fish. Ganges*: 201, 379, pl. 23, fig. 66 (type-locality : higher parts of Gangetic estuaries).

1877. *Macrones gulio* : Day, *Fish. India* : 445 pl. 99, fig. 2.

1991. *Mystus gulio* : Talwar and Jhingran, *Inland Fishes*, 2 : 560-62, fig.185.

Common Names : Long-whiskered catfish (Eng.); Kontia (Oriya); Jella (Telugu).

Material : 13.2.89, Saharbedi river near Poddampur, 15 exs., 75-79 mm, F.437, T.V.; 15.2.89, Mahanadi mouth at Paradeep, 2 exs., F. 292, T.V.; 15.2.89, Mahanadi mouth at Paradeep, 8 exs., 64.0-81.0 mm, F.631, T.V.; 17.2.89, Mahanadi mouth of Paradeep, 3 exs.,

F.555, T.V.; 19.2.89, Mahanadi mouth light house side, 51 exs., 57-87 mm, F.389, T.V.; 20.2.89, Mahanadi mouth Paradeep, 21 exs., 60-70 mm, T.V.; 20.2.89, Mahanadi mouth at Paradeep, 7 exs., 65-140 mm, F.358, T.V.; 21.2.89, Devi river near Ashtaranga, 1 ex., 20.0 mm, T.V.; 23.11.90, Devi river near Ashtaranga, 3 exs., 70-135 mm, F.703, D.S.M.; 17.3.91, Mangrove forest, Paradeep, 84.0 mm, 1 ex., F.500, T.V.; 24.3.91, Mahanadi mouth light house side, 1 ex., 48.0 mm, 1 ex., 48.0 mm, F.691, T.V.

Diagnosis : Body plain. No blotch at base of caudal fin. Adipose dorsal fin base shorter than or equal to fin base. Median longitudinal groove short, extending slightly beyond posterior border of orbit.

Distribution : Pakistan, India, Bangladesh and Burma.

Remarks : It attain 400 mm.

Mystus vittatus (Bloch)

1797. *Silurus vittatus* Bloch, *Ichth.* p.371, fig. 2 (type-locality : Tranquebar).
 1878. *Macrones vittatus* : Day, *Fish India* : 448-449, pl. 98, fig. 3.
 1981. *Mystus vittatus* : Jayaram, *Fish India H.B.* : 195-204, fig. 94A.
 1991. *Mystus vittatus* : Talwar and Jhingran, *Inland Fishes*, 2:573, 74, fig. 190.

Common Names : Striped dwarf catfish (Eng.); Tengra, Kuntiah (Oriya); Suku-jella, Erra-jella (Telugu).

Material : 13.2.89, Saharbedi river near Poddampur, 3 exs., 41-49 mm, F.448, T.V.; 15.2.89, Mahanadi mouth at Paradeep, 2 exs., 65.0 mm, F. 289, T.V.; 16.10.90, Mahanadi mouth at Paradeep, 2 exs., 76-88 mm, F. 645, T.V.; 16.3.91, 12 exs., 64.0-91.0 mm, Mahanadi mouth near light house, 4 exs., F. 602, T.V.;

Diagnosis : Eye diameter 4.5 to 5.0 in head length. Pectoal fin with 9 rays. Body with 3 or 4 longitudinal colour bands above and below the lateral line. A dark shoulder spot. No spot at the base of caudal fin.

Distribution : Pakistan, India, Bangladesh, Nepal, Sri Lanka, Burma and Thailand.

Remarks : It grows upto 225 mm.

Family ARIIDAE

Genus *Arius* (Valencennes)

Arius gagora (Hamilton)

1822. *Pimelodus gagora* Hamilton, *Fishes of Ganges* : 167, 376, pl. 10, fig. 54, (type-locality : estuaries of Ganges).
 1877. *Arius gagora* : Day, *Fishes of India* : 465, pl. 07, fig. 2.
 1991. *Arius gagora* : Talwar and Jhingran, *Inland Fishes*, 2 : 702-703.

Common Names : Gagora cat fish (Eng.).

Material : 23.11.90, Devi river near Astaranga, 1 ex., 140, F.700, DSM.; 21.2.89, Devi river near Astaranga, 2 exs., 126-146 mm, T.V.

Diagnosis : Teeth on palate as a single patch but relatively smaller, triangular or conical in shape. Pectoral spine equals dorsal spine length. A black spot on adipose dorsal fin.

Distribution : India; West Bengal and Orissa; and Bangladesh.

Remarks : It attains 30 mm.

***Arius maculatus* (Thunberg)**

1792. *Silurus maculatus* Thunberg, *Kongl vet. Akad. Nya Handl. Stockholm. 13* : 31, pl. 1, fig. 2 (type-locality : Japan).
 1877. *Arius falcarius* : Day, *Fishes of India* : 463, pl. 106, fig. 5.
 1877. *Arius malabaricus* : Day, *Fishes of India* : 464, pl. 107, fig. 4.
 1984. *Arius maculatus* : Talwar and Kacker, *Comm. Sea Fish. India.*, 264-265, fig. 107.

Common Names : Spotted cat fish (Eng.)

Material : 22.2.89, Devi river near Ashtaranga, 1 ex., 147-0 mm, F. 355, T.V.

Diagnosis : 3 pairs of barbels. Teeth on palate granular or molar-like, in two large semi-oval patches normally far behind premaxillary tooth band. Tip of dorsal fin usually prolonged as a filament. Adipose dorsal fin small. All fins black tipped, adipose dorsal blackish.

Distribution : Pakistan, India, Sri Lanka, to Indo-Australian Archipelago, but not the Philippines and Australia.

***Arius satparanus* (Chaudhuri)**

Material : 21.2.89, Devi river near Ashtaranga, 1 ex., 205 mm.

Remarks : Base bone on dorsal surface smooth, teeth not calcareous, soft to touch.

***Arius tenuispinis* Day**

1877. *Arius tenuispinis* Day, *Fishes of India* : 466, pl. 107, fig. 5 (type-locality : Bombay).
 1991. *Arius tenuispinis* : Talwar and Jhingran, *Inland Fishes, 2* : 705-706, fig. 226.

Common Names : Thinspine Sea catfish (Eng.)

Material : 10.2.90, Devi river near Ashtaranga, 1 ex., 165.0 mm, F. 720, C.A.N.R.

Diagnosis : Snout obtusely rounded, Tooth patch on palate pearshaped, placed at deep posterior extremity of roof of mouth, palatine teeth globular. Barbels 3 pairs. Tips of dorsal,

pectoral and caudal fins dark.

Distribution : East coast of Africa and India.

Remarks : It attains about 20 cm. This cat fish is known only from Chilka lake (Talwar and Jhingran, 1991). The presence of this species in Devi estuary, shows extension of distribution in north till Devi estuary.

Family PLOTOSIDAE

Genus *Plotossus* Lacepede

Plotossus canius Hamilton

1877. *Plotossus canius* : Day, *Fishes of India* : 482, pl. 112, fig. 3.

1991. *Plotossus canius* : Talwar and Jhingran, *Inland Fishes, 2* : 713-714, fig. 231.

Common Names : Canine cat-fish-eel (Eng.); Kamada (Oriya); Ungilayi, Ingilayi (Telugu).

Material : 15.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 192-210 mm, F. 298, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., F. 636, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 195-228 mm, F. 345, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 188.0 mm, F. 449, T.V.

Diagnosis : Body without stripes; barbels 4 pairs, nasal barbels long, reaching well behind spines, usually to nape; eyes small, eye diameter 8.3 to 14.3 times in head length; large vermiform papillae on gill arches and gill filaments; body and fins dark.

Distribution : India, Sri Lanka, Bangladesh, Burma, through the Indo-Australian Archipelago, to the Phillipines, Papua and New Guinea.

Remarks : This is one of important and dangerous cat fishes of India. The dorsal and pectoral spines are equipped with venom glands and are capable of causing extremely painful wounds, even with slight contact, some times even fatal.

Order MYCTOPHIFORMES

Family SYNODIDAE

Genus *Saurida* Valenciennes

Saurida micropectoralis Shindo & Yamda

Material : 22.2.89, Devi river near Ashtaranga, 2 exs., 111-136, F.321, T.V.; 22.2.89, Devi river near Ashtaranga; ex., 215 mm, T.V.

Remarks : In one example (111.0 mm SL) on the right side 8 rays and left side 9 rays.

Diagnosis : Pectoral fins short, their tips reaching to level of pelvic-fin origin.

Saurida tumbil (Bloch)

1795. *Salmo tumbil* Bloch, *Naturges, ausland. Fische*, 9 : 112, pl. 430.
 1877. *Saurida tumbil* : Day, *Fishes of India* : 504, pl. 117, fig. 6.
 1884. *Saurida tumbil* : Talwar and Kacker, *Comm. Sea Fish. India*. 284-285.

Common Names : Greater lizardfish (Eng.); Bade-mottah (Telugu).

Material : 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 1 ex., 65.0 mm, F. 624, T.V.

Daagnosis : Pectoral fin with 14 to 15 rays : Pectoral fin extends to pelvic fin origin; head lizard-like, back and upper sides brownish.

Distribution : Indo-West Pacific.

Remarks : It grows to 45 cm.

Order GADIFORMES

Family BREGMACEROTIDAE

Genus *Bregmaceros* Thompson

Bregmaceros macclellandi Thompson

1840. *bregmaceros macclellandi* Thompson, *Mag. nat., Hist. Charlesworth*, 4:184, fig. (type-locality : Gangetic delta).
 1877. *bregmaceros atripinnis* : Day, *Fishes of India* : 418, pl. 41, fig. 1.
 1984. *Bregmaceros macclellandi* : Talwar and Kacker, *Comm. Sea Fish. India*. 294-295, fig. 120.

Common Names : Indian Cod (Eng.); Misalu magu (Telugu)

Material : 11.2.89, Mahanadi mouth at Paradeep, 2 exs., 29-36 mm, F.388, T.V.

Diagnosis : First dorsal fin a single long ray on head reaching to second dorsal fin. Second dorsal fin long, with large notch in middle. Anal fin long, with large notch in middle. Pelvic fin with 5 soft rays, the three outer rays long, separate filaments which trail backward for one-half the length of fish.

Distribution : Indo-West Pacific.

Remarks : Grows upto 15 cm.

Order SYNGNATHIFORMES

Family SYNGNATHIDAE

Genus *Ichthyocampus* Kaup*Ichthyocampus carce* (Hamilton)

1822. *Syngnathus carce* Hamilton, *Fishes of Ganges* : 13, 362 (type-locality : Ganges estuary).
 1878. *Ichthyocampus carce* : Day, *Fishes of India* : 679, pl. 174, fig. 2.
 1991. *Ichthyocampus carce* : Talwar and Jhingran, *Inland Fishes. 2* : 768.

Common Names : Fresh water pipe fish (Eng.).

Material : 24.3.91, Mouth of Mahanadi, light house side, Paradeep, 1 ex., 110.0 mm, F. 689, T.V.

Diagnosis : Anal fin present, Lateral trunk ridge deflected ventral near anal ring; dorsal fin origin on tail. Opercle with complete longitudinal ridge. Dorsal fin origin from rear margin of first tail ring to middle of third. Ridges on body and tail continuous and continued to caudal fin.

Distribution : West coast of India to Celebes.

Remarks : Attains 15 cm. Brood pouch is restricted to underside of tail. It breeds in Chilka lake.

Genus *Microphis* Kaup*Microphis cuncalus* (Hamilton)

1822. *Syngnathus cuncalus* Hamilton, *Fishes of Ganges* : 12, 362 (type-locality : estuaries near Calcutta).
 1878. *Doryichthys cuncalus* : Day, *Fishes of India* : 679, pl. 174, fig. 4.
 1991. *Microphis cuncalus* : Talwar and Jhingran, *2* : 770-771.

Common Names : Crocodile-tooth pipe fish (Eng.); Kunnur dant (Oriya).

Material : 24.3.91, Mahanadi estuary light house side, Paradeep, 1 ex., 97.0 mm, F. 690, T.V.

Diagnosis : Opercle without supplemental ridges below longitudinal ridges. Dorsal fin rays 47 to 56; most relatively deep, its depth averages 5.8 times in snout length; tail rings 24 to 27.

Remarks : Attains 12 cm.

***Microphis deocata* (Hamilton)**

1822. *Syngnathus deocata* Hamilton, *Fishes of Ganges* : 14, 363 (type-locality : rivers of northern Bengal and Bihar).
 1878. *Doryichthys deocata* : Day, *Fishes of India* : 680.
 1991. *Microphis deocata* : Talwar and Jhingran, *Inland Fishes*, 2 : 771-772.

Common Names : Deocata pipe fish (Eng.)

Material : 5.12.89, Mahanadi mouth near Paradeep, 1 ex., 116 mm, DSM.

Diagnosis : Opercle without supplemental ridges below longitudinal ridges. Dorsal fin rays 29 to 36; snout relatively slender, its depth averages 6.7 to 7.2 times in snout length. Tail rings 29 to 33, lateral snout ridges poorly defined or obsolete. Anal fin located in a distinct depression, separated from anus by a transverse fleshy septum.

Distribution : North Bengal, Bihar, Assam and Bangladesh.

Remarks : It attains 18 cm.

Family BATRACHOIDIDAE

Genus *Austrobatrachus* Smith

***Austrobatrachus dussumieri* (Valenciennes)**

1857. *Batrachus dussumieri* Valenciennes (in Cuv. val.) *Hist. Nat. Poiss*, 12 : 474 (type-locality : Malabar coast).
 1889. *Batrachus grunniens* : Day, *Fauna Brit. India*, 2 : 229, fig. 83.
 1991. *Austrobatrachus dussumieri* : Talwar and Jhingran, *Inland Fishes*, 2 : 726.

Common Names : Toad or Frog fish (Eng.).

Material : 19.10.90, Mahanadi estuary at Battighara light house, Paradeep, 1 ex., 195 mm, F. 684, C.A.N.R.

Diagnosis : Pectoral axillary foramen present, gill aperture continued below and anterior of pectoral base.

Distribution : India, Pakistan and Sri Lanka.

Remarks : It is a new record (Venkateswarlu *et al.* 1993).

Order ATHERINIFORMES

Suborder EXOCOETOIDEI

Family HEMIRAMPHIDAE

Genus *Hemirhamphus* Cuvier*Hemirhamphus far* (Forsk.)

1775. *Esox far* Forskal, *Descript. Animal* : 67 (type-locality : Lohaja, Red Sea).
 1877. *Hemirhamphus far* : Day, *Fishes of India* : 516, pl. 70, fig. 3.
 1984. *Hemirhamphus far* : Talwar and Kacker, *Comm. Sea Fish. India* : 310, fig. 126a.

Common Names : Black-barred halfbeak (Eng.).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 3 ex., F. 566, T.V.

Diagnosis : Lower jaw distinctly elongate. Pre-orbital ridge absent. Upper jaw scaleless. Dorsal fin with well developed anterior lobe, pigmented in anterior part. Dark spots on sides of body.

Distribution : Indo-west Pacific.

Genus *Hyporhamphus* Gill*Hyporhamphus limbatus* (Valenciennes)

1846. *Hemirhamphus limbatus* Valenciennes, *Hist. nat. Poiss.*, 19 : 44 (type-locality : Malabar, Bombay and Pondichery).
 1877. *Hemirhamphus limbatus* : Day, *Fishes of India* : 516, pl. 119, fig. 3.
 1991. *Hyporhamphus limbatus* : Talwar and Jhingran, *Inland Fishes* : 2 : 734, fig. 236.

Common Names : Valenciennes half-beak, Congaturi half-beak (Eng.); Sarbara (Oriya).

Material : 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 164.0 mm, F. 360, T.V.; 20.2.89, 1 ex., 155.0 mm, F. 460, T.V.; 21.2.89, Devi river mouth at Ashtaranga, 1 ex., 150 mm, F. 508, T.V.; Mouth of Mahanadi at Paradeep, 2 ex., 146-158, F. 760, DSM. 16.3.91, Mangrove forest at Paradeep, 1 ex., 108.0 mm, F. 654, T.V.; 22.3.91, Mangrove forest at Paradeep, 1 ex., 140.0 mm., T. V.

Diagnosis : Upperjaw covered with scales, preorbital ridge well-developed; Nasal papillae not fimbriate; upper jaw flat or nearly flat; Lateral line with one branch ascending towards Pectoral fin origin; gill rakers on first arch 23 to 27; Fleshy tip of beak reddish. Fins hyaline. Caudal fin emarginate, not strongly forked.

Distribution : Persian Gulf, Pakistan, India, Sri Lanka, Burma, to Thailand and China.

Remarks : This is common in Chilka Lake.

Genus *Rhynchorhamphus* Fowler

Rhynchorhamphus malabaricus Collette

1877. *Hemirhamphus georgia* Day, *Fishes of India* : 515, pl. 120, fig. 2 which is *Hemirhamphus lutkei*.
 1976. *Rhynchorhamphus malabaricus* Collette, *Bull. mar. Sci.* 26 : (4) : 84, fig. 8B. (type-locality : Myliddchy near Kankesanthrai, Sri Lanka).
 1984. *Rhynchorhamphus malabaricus* : Talwar and Kacker, *Comm. Sea Fish. India* : 317 fig. 128.

Common Names : Long-billed half-beak (Eng.).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 238.0 mm, F. 306, T.V.

Diagnosis : Lower jaw longer, upper jaw scaly; pre orbital ridge present; nasal papilla fimbriate; upper jaw arched and dome shaped; lateral line with 2 different branches ascending behind opercle and from pectoral fin origin; greenish above, silvery below.

Distribution : Coasts of South India and Sri Lanka.

Family BELONIDAE

Genus *Strongylura* Van Hasselt

Strongylura leiura (Bleeker)

1851. *Belone leiura* Bleeker, *Nat. Tijdschr. Ned-Indie.* 1 : 94 (type-locality : Java).
 1877. *Belone leiurus* : Day, *Fishes of India* : 511.
 1991. *Strotngylura leiura* : Talwar and Jhingran, *Inland Fishes*, 2 : 741-742, fig. 237.

Common Names : Banded needle fish, Square tail needle fish (Eng.).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 ex., 250 mm, F. 531, T.V.; 22.3.91, Mangrove forest, Paradeep, 1 ex., 277.0 mm.

Diagnosis : No black spot at base of caudal fin; dorsal fin rays 17 to 20; and anal fin rays 21 to 25; caudal fin emarginate; origin of dorsal fin above 7 to 10 th. ray of anal fin; a silvery stripe along sides.

Distribution : Indo-West Pacific.

Remarks : It attains 75 cm.

Strongylura strongylura (Van Hasselt)

1823. *Belone strongylura* Van Hasselt, *Alogem Konst. Letter-Bode*, 2 : 130 (type-locality : Vizagapatnam).

1877. *Belone strongylurus* : Day, *Fishes of India* : 512, pl. 118, fig. 6.

1991. *Strongylura strongylura* : Talwar and Jhingran, *Inland Fishes*, 2: 742-743, fig. 238.

Common Names : Spot tail needle fish, Round tail needle fish (Eng.); Gania (Oriya); Wodlah muku, Kuddera (Telugu).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 247.0 mm, F. 348, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 220.0 mm, F. 454, T.V.; 5.12.89, Mouth of Mahanadi at Paradeep, 20 exs., 91-172 mm, F. 754, DSM.

Diagnosis : A prominent round black spot at base of caudal fin; dorsal fin rays 12 to 15; and anal fin rays 15 to 18; caudal fin rounded or truncate.

Distribution : Indo-West Pacific.

Remarks : It attains 43 cm. This is common in Chilka Lake.

Order SCORPAENIFORMES

Suborder PLATYCEPHALOIDEI

Family PLATYCEPHALIDAE

Genus *Platycephalus* (Bloch)

Platycephalus scaber (Linnaeus)

1758. *Cottus scaber* Linnaeus, *Systema Naturae*, ed. 10, 1 : 264 (type-locality : not known).

1876. *Platycephalus scaber* : Day, *Fishes of India*, 275, pl. 60, fig. 4.

1991. *Grammoplites scaber* : Talwar and Jhingran, *Inland Fishes*, 2 : 782.

Common Names : Rough flathead (Eng.); Irrwa (Telugu).

Material : 19.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 132.0 mm, F.404, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 130-140 mm, F.459, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 121 mm, F.329, T.V.

Diagnosis : Pored scaled in lateral line about 60 or fewer; teeth on vomer in two separate patches. Preopercular spine short, does not extend to gill opening. Lateral line spiny along its entire length. Black regular dots along lateral line, head and body.

Distribution : Indo-west Pacific.

Platycephalus bengalensis Visweswara Rao

1966. *Platycephalus bengalensis* Visweswara Rao, *Ann. Mag. nat. Hist.* (13)9 : 124, fig. 1 (type-locality : Visakhapatnam).

1984. *Platycephalus bengalensis* : Talwar and Kacker, *Comm. Sea Fish. India*. 338, fig. 137.

Common Names : Bengal's flat head (Eng.).

Material : 18.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 90 mm, F.547, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 51.0 mm, F.585, T.V.

Diagnosis : Anterior scales of lateral line with 7 or 8 spines; Lateral line with 72 to 78 scales; sharp spine before and behind upper margin of each eye; supra orbital ridge serrated. Body with irregular dark blotches.

Distribution : North east coast of India.

Platycephalus indicus (Linnaeus)

1758. *Callionymus indicus* Linnaeus, *Systema Naturae*, ed. 10:250 (type-locality : Asia).

1876. *Platycephalus insidiator* : Day, *Fishes of India*, : 276.

1991. *Platycephalus indicus* : Talwar and Jhingran, *Inland Fishes*, 2 : 782-783.

Common Names : Indian Flathead, Bartail flathead (Eng.); Irrwa. (Telugu)

Material : 11.2.89, Mahanadi mouth, Paradeep, 2 exs., 154-193 mm, F. 383, T.V.; 13.2.89, Devi river mouth near Sonadhara, 7 exs., 35-146 mm, F.371, T.V.; 13.2.89, Saharbedi river near Poddampur, 1 ex., 145.0 mm, F.436, T.V.; 15.2.89, Mahanadi mouth, Paradeep, 5 exs., 73-78 mm, 1 ex., 850 mm, F.291, T.V.; 17.2.89, Mahanadi mouth near Paradeep, 2 exs., F.565, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 9 exs., 71-180 mm, F. 399, T.V.; 20.2.89, Mahanadi mouth at Paradeep, 4 exs., 79-95 mm, F. 451, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 4 exs., 185-198 mm, F. 529, and F. 544, T.V.; 19.10.90, Battighara, Paradeep, 2 exs., F. 710, T.V.; 16.3.91, Mahanadi mouth at Paradeep, 1 ex., 115.0 mm, F. 606, T.V.; 17.3.91, Mangrove forest at Paradeep, F.502, T.V.; 22.3.91, Mangrove forest, Paradeep 2 ex., 97-146 mm.

Diagnosis : Head extremely depressed; pelvic fins behind pectoral fin base; spinous dorsal fin preceded by a single short isolated spine. Lateral line entirely smooth (bearing no spine). Teeth on vomer in one transverse patch; top of head almost smooth. 2 preopercular spines.

Distribution : Indo-Pacific.

Remarks : Very common in the trawl catches.

Family SYNANCEIDAE

Genus *Amblyapistus* Bleeker

Amblyapistus taenianotus (Cur and Val.)

1878. *Amblyapistus taenianotus*, Day, *Fish. India*, F. 157, pl. 38.

1962. *Amblyapistus carinatus*, Weber & de Beaufort, *Fish Indo. Aust. Arch.* 11:76-77.

Material : 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 70 mm, T.V.

Diagnosis : Head and body strongly compressed, no groove across occiput. Sharp preorbital and preopercular spines; bones of the head armed. Teeth in jaws, vomer and palate. A single dorsal fin, 3 anal spines; no free rays at base of pectoral; articulated fin rays branched. Scales rudimentary or absent. Second dorsal spine as high as the body. Irregular dark spots and blotches; a brown mark between fifth and seventh dorsal spines. 17 dorsal spines, 5 anal rays. Dorsal, anal and pectoral forked. Origin of dorsal above eye.

Distribution : Andamans to Malay Archipelago and beyond.

Remarks : It is a new record from main land of India.

Family SCORPAENIDAE

Genus *Minous* Cuv. & Val.

Minous monodactylus (Bloch and Schneider)

1801. *Scorpaena monodactylus*, Bloch *Syst. Ichth.* F. 194.

1878. *Minous monodactylus*, Day, *Fish. India.* F. 159, pl. 38, fig. 7.

1962. *Minous monodactylus*, Weber & de Beaufort, *Fish, Indo, Aust, Arch.*, **11** : 111-112.

Material : 18.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 60.0 mm, F. 379, T.V.; 19.2.89, Mouth of Mahanadi, light house side, Paradeep, 1 ex., 44.0 mm, F. 394, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 59.0 mm, F. 417, T.V.

Diagnosis : First dorsal spine as long as or almost as long as second dorsal spine. Head large, body compressed; a groove across occiput; preorbital with a strong spine; preopercle spinate; opercles armed, villiform teeth on jaws and vomer. A single dorsal fin, pectoral fin with a free ray at its base; scales absent.

Distribution : Seas of India to China.

Remarks : Grows upto 15 cm.

Family SYNANCEIDAE

Genus *Polycaulis* Gunther

Polycaulis uranoscopus (Bloch & Schneider)

1801. *Synanceia uranoscopus*, Bloch & Schneider, *Syst. Ichth.*, p. 195.

1878. *Polycaulis uranoscopus*, Day, *Fish. India.* p. 164, plate. 39, fig. 6.

1962. *Polycaulis uranoscopus*, Weber & de Beaufort, *Fish, Indo, Aust. Arch.*, **11** : 102-103, fig. 29.

Material : 11.3.92, Mangrove forest at Paradeep, 1 ex., 55.0 mm, F. 745, T V

Diagnosis : Body anteriorly sub cylindrical, posteriorly compressed. Eyes directed some

what upwards. Pre-opercle armed. Teeth villiform in jaws, none on vomer and palate. A single dorsal fin, no free ray at base of the pectoral fin. Articulated fin-rays unbranched. Scaleless. Brown, with the fins black-edged or else spotted with white.

Distribution : India to Malay Archipelago.

Remarks : Grown to 12 cm.

Order PERCIFORMES

Suborder PERCOIDEI

family CENTROPOMIDAE

Genus *Lates* Cuvier

Lates calcarifer (Bloch)

1790. *Holocentrus calcarifer* Bloch, *Naturges, ausland, Fische*, (4):100, pl. 244 (type-locality : Indonesia).
 1875. *Lates calcarifer* : Day, *Fishes of India* ; 7 pl. 1, fig. 1.
 1991. *Lates calcarifer* : Talwar and Jhingran, *Inland Fishes*, 2 : 789-790, fig. 248.

Common Names : Barramundi, Bhekta (Eng.); Bekkut, Durrwah (Oriya); Pandu Koppa, Pandu Meenu, Pandu chepa (Telugu).

Material : 23.10.90, Devi river near Ashtaranga, 1 ex., 165 mm, F. 702, T.V.

Diagnosis : Lateral line complete. Dorsal fin with 7 to 9 spines. Caudal fin rounded. Upper jaw reaching to behind eyes; nostrils close together; lower edge of pre-opercle serrated; tongue smooth. Mouth large, Scales large, ctenoid.

Distribution : Indo-West Pacific.

Remarks : It grows upto 150 cm. A good food fish.

Family AMBASSIDAE

Genus *Ambassis* Cuvier

Ambassis commersoni Cuvier

1828. *Ambassis commersoni* Cuvier (Partim), *Hist. nat. Poiss.*, 2 : 176, pl. 25, fig. 29 (type-locality ; Pondichery).
 1875. *Ambassis commersoni* : Day, *Fishes of India* : 52, pl. 15, fig. 3.
 1991. *Ambassis commersoni* : Talwar and Jhingran, *Inland Fishes*, 2 : 794-795.

Common Names : Commerson's glassy perchlet (Eng.).

Material : 10.2.89, Mahanadi mouth at Paradeep, 10 exs., 40-85 mm, F. 425, T.V.; 12.2.89, Mahanadi mouth at Paradeep, 4 exs., 37.60 mm, F. 303, T.V.; 13.2.89, Saharbedi river near Poddampur, 3 exs., 35-64 mm, F.440, T.V.; 14.2.89, Mahanadi mouth at Paradeep, 18 exs., 64-80 mm, F. 588, T.V.; 17.2.89, Mahanadi mouth at Paradeep, 1 exs., 70 mm, F. 557, T.V.; 18.2.89, Mahanadi mouth at Paradeep, 2 exs., 62-63 mm, F.553, T.V.; 18.2.89, Mahanadi mouth at Paradeep, 11 exs., 35-76 mm, F. 583, T.V.; 19.2.89, Mahanadi mouth at Paradeep, 1 ex., 66.0 mm, F. 406, T.V.; 22.2.89, R. Devi river mouth near Ashtaranga, 1 ex., 52.0 mm, F. 332, T.V.

Diagnosis : Lateral line complete. Predorsal scales 16 to 21. A black blotch on spinous dorsal fin between 2nd and 3rd spines; a black streak on both lobes of caudal fin.

Distribution : Indo-west Pacific.

Remarks : Grows upto 18 cm, They are used as bait for.

Ambassis dayi Bleeker

1874. *Ambassis dayi* Bleeker, *Natuurk. Verh. Holland, Maatsch, Wetensch. Haarlem.* 2 (2) : 95 (type-locality : Malabar).
 1875. *Ambassis dayi* : Day, *Fishes of India* : 54, pl. 15, fig. 7.
 1991. *Parambassis dayi* : Talwar and Jhingran, *Inland Fishes*, 2 : 801-802.

Common Names : Day's glassy perchlet (Eng.).

Material : 21.3.91, Mangrove forest at Paradeep, 6 ex., 42.0-62.0 mm, F. 656, T.V.

Diagnosis : Supra orbital ridge smooth, at most with one or two spines posteriorly; interoperculum denticulate posteriorly. Cheek with 6 transverse scale rows; snout tip rather slanting; lateral line scale about 30.

Distribution : Western ghats of Kerala.

Remarks : Talwar and Jhingran (1991) says this species is endemic to Kerala. So the record of this species from Mahanadi estuary, far away from Kerala is interesting.

Ambassis dussumieri Cuvier

1828. *Ambassis dussumieri* Cuvier, *Hist. nat. Poiss.*, 2 : 181 (type-locality : Malabar).
 1865. *Ambassis dussumieri* : Day, *Fishes of Malabar* : 16.
 1991. *Ambassis dussumieri* : Talwar and Jhingran, *Inland Fishes*, 2 : 795-796.

Common Names : Malabar glassy perchlet (Eng.).

Material : 16.3.91, Mahanadi mouth, light house side, Paradeep, 3 exs., 44.0-46.0 mm, F.611, T.V.

Diagnosis : Lateral line interrupted. Supraorbital ridge serrated. Hind margin of preoperculum finely denticulated. Head length about 2.7 times in standard length.

Distribution : Mauritius, Seychelles, South India, Andamans, Malaysia, Celebes and China.

Ambassis gymnocephalus (Lacepede)

1802. *Lugjanus gymnocephalus* Lacepede, *Hist. nat. Poissa*, 3 : 181, 216, pl.23, fig.3.

1875. *Ambassis gymnocephalus* : Day, *Fishes of India* : 54, pl.15, fig. 6.

1991. *Ambassis gymnocephalus* : Talwar and Jhingran, *Inland Fishes*; 2 : 796.

Common Names : Bald glassy perchlet (Eng.); Chandee (Oriya); Mullu tharu (Telugu).

Material : 5.12.89, Mouth of Mahanadi at Paradeep, 3 exs., 42-46, F. 770, DSM.; 26.7.90, Battighara, Paradeep, 3 exs., 35.0-40.0 mm, T.V.

Diagnosis : Lateral line interrupted. Supra orbital ridge serrated. Hind margin of preoperculum entire; head length 2.8 times in standard length. Preorbital dentate.

Distribution : Indo-west Pacific.

Family SERRANIDAE

Genus *Epinephelus* Bloch

Epinephelus malabaricus (Schneider)

1801. *Holocentrus malabaricus* Schneider, *Syst. Ichthyol* : 319, pl.63 (type-locality : Tranquebar, Tamil Nadu).

1875. *Serranus malabaricus* : Day, *Fishes of India*, 20, pl.4, fig. 3.

1991. *Epinephelus malabaricus* : Talwar and Jhingran, *Inland Fishes*, 2 : 807.

Common Names : Malabar rock cod (Eng.).

Material : 15.2.89, Mahanadi mouth at Paradeep, 3 exs., 65.0-140.0 mm, F. 634, T.V.

Diagnosis : Lateral line tubes not branched; eye diameter more than half of inter-orbital width. Pored lateral line scales 56 to 67; gill rakers 13 to 16 on lower arm of first arch; body scales ctenoid, except for those on belly.

Distribution : Indo-west Pacific.

Genus *Promicrops* Gill

Promicrops lanceolatus (Bloch)

1790. *Holocentrus lanceolatus* Bloch, *Naturges. ausland. Fische*, (4) : 92, pl. 242, fig. 1. (type-locality : East Indies).

1875. *Serranus lanceolatus* : Day, *Fishes of India* : 18, pl. 4., fig. 1.

1991. *Promicrops lanceolatus* : Talwar and Jhingran, *Inland Fishes* : 2 : 808.

Common Names : Bridle bass, Mottled brows sea brass (Eng.); Kolaygi (Oriya); Punni-min, Pilli punni, Punni meenu (Telugu).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 150 mm, F.569, T.V.

Diagnosis : Lateral line tubes branched; eye diameters 1/2 or less of inter-orbital width; pre-opercle serrated but no spines; mouth large, maxilla reaching well past eye; colour brown with pale mottling.

Distribution : Indo-west Pacific.

Remarks : This is one of largest bony fish, growing to 180 cm and weighing 350 kg. Large specimens can be aggressive and dangerous.

Family TERAPONIDAE

Genus *Terapon* (Cuvier)

Terapon jarbua (Forsk.)

1775. *Sciaena jarbua* Forskal, *Descript Animalium* : 50 (type-locality : Djedda, Red Sea).
 1875. *Therapon jarbua* : Day, *Fishes of India*, 69, pl. 18, fig. 4.
 1991. *Terapon jarbua* : Talwar and Jhingran, *Fishes of India*, 2 : 811.

Common Names : Jarbua terapon (Eng.); Gahanu (Oriya); Baikeeli (Telugu).

Material : 13.2.89, Saharabedi river near Poddampur, 3 exs., 34-59 mm, F.439, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 22 exs., F. 509, T.V.; 16.3.91, Mouth of Mahanadi near light house side, Paradeep, 1 ex., 54.0 mm, F. 618, T.V.; 21.3.91, Mangrove forest near Paradeep, 7 exs., F. 648, T.V.

Diagnosis : Gill raker 12 to 15 on lower arm of first arch; pored lateral line scales 75 to 100; 13 to 17 rows of scales above lateral line, and 19 to 24 rows below it; 3 to 4 downwardly curved longitudinal stripes along back.

Distribution : Indo-west Pacific.

Remarks : It grows upto 25 cm. It is robust and hardy fish for brackish aquaria.

Terapon theraps Cuvier

1829. *Therapon theraps* Cuvier, *Hist. nat., Poiss.*, 3:129, pl. 53 (type-locality : Java, Mahe).
 1875. *Therapon theraps* : Day, *Fishes of India* : 70, pl. 18, fig. 6.
 1991. *Terapon theraps* : Talwar and Jhingran, *Inland Fishes*, 2:812-813.

Common Names : Banded grunter, Large scaled terapon (Eng.); Gahnu (Oriya); Baikeeli (Telugu).

Material : 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 73.0 mm, F. 339, T.V.

Diagnosis : Pored lateral line scales 46 to 56; 6 to 8 scales above lateral line; gill rakers 14 to 17 on lower arm of first arch; body with four horizontal stripes, dorsal, anal and caudal with black blotches.

Distribution : Indo-west Pacific.

Remarks : Common in Ganges estuary.

Family URANOSCOPIDAE

Genus *Ichthyoscopus*

Ichthyoscopus inermis Cuvier

1876. *Uranoscopus inermis* : Day, *Fishes of India* : 261, pl. 55., fig. 5.

Material : 9.3.92, Hukitola, 2 exs., 34.0 35.0 mm, F. 659, T.V.

Diagnosis : A single dorsal fin. Head armed with bony plates. Scales rudimentary. Eyes on upper surface of head. Cleft of mouth vertical. A dark bar across the pectoral and caudal fin.

Distribution : Seas of India to Japan.

Family SILLAGINIDAE

Genus *Sillaginopsis* Gill

Sillaginopsis panijus (Hamilton)

1822. *Cneilodipterus panijus* Hamilton, *Fishes of Ganges* : 57, 367 (type-locality : Ganges estuaries).

1876. *Sillago domina* : Day, *Fishes of India* : 315.

1991. *Sillaginopsis panijus* : Talwar and Jhingran, *Inland Fishes, 2* : 816, fig. 253.

Common Names : Gangetic siliago (Eng.); Tool-danti (Oriya); Yerra soring (Telugu).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 exs., 90.0 mm, F.536, T.V.

Diagnosis : Snout and head greatly depressed; second dorsal spine very elongate; eyes small and almost covered by fleshy orbit; lateral line with 84 to 88 scales; body greenish-yellow above, paler below; fins with black spots.

Distribution : India, South-west coast to Burma, to Malaysia..

Remarks : It attains 45 cm.

Genus *Sillago* Cuvier*Sillago chondropus* (Bleeker)

1858. *Sillago chondropus* Bleeker, *Nat. Tijdschr. Ned. Ind.* 17 : 164 (type-locality : Java).
 1991. *Sillago chondropus* : Talwar and Jhingran, *Inland Fishes*, 2 : 817.

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 172.0 mm, F. 309, T.V.

Diagnosis : Pelvic fin spine very small and situated at base of thickened club-shaped outer pelvic ray; scales on head ctenoid, body without dark blotches.

Distribution : Indo-Australian Archipelago.

Remarks : It is not reported from India earlier (Talwar nad Jhingran, 1991). So it is the first record of this species from Indian waters.

Sillago maculata Quoy & Gaimard

1824. *Sollago maculata* Quoy and Gainmard, *Voy. Uranie et Physie. Zool.* : 261, pl. 5, fig. 2.
 1984. *Sillago maculata* : Talwar and Kacker, *Comm. Sea. Fish. India* : 425-426. fig. 163.

Common Names : Trumpeter sillago (Eng.).

Material : 21.2.89, Devi river near Ashtaranga, 1 ex., 70 mm. F.519, T.V.; 22.3.89, Mangrove forest, Paradeep, 1 ex., 64.0 mm.

Diagnosis : Pelvic fin spine normal, base of pectoral fin with blue-black blotch or spot, body with irregular dark blotches, dorsal fin with 19 to 21 soft rays; anal fin with 18 to 20 soft rays; blotches on dorsal fins.

Distribution : Indo-west Pacific.

Remarks : It attains 30 cm.

Sillago sihama (Forsk.)

1775. *Atherina sihama* Forskal, *Descript Animal*, : 70 (type-locality : Lohaja, Red Sea).
 1876. *Sillago sihama* : Day, *Fishes of India*, 265, pl. 57, fig. 3.
 1991. *Sillago shiama* : Talwar and Jhingran, *Inland Fishes*, 2 : 818-819, fig. 254.

Common Names : Silver sillago (Eng.); Toul-danti (Oriya); Soring, Tella-soring, Arritiki (Telugu).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 3 exs., 120-126 mm, F. 434, T.V.; 13.2.89, Devi River mouth near Sonadhara, 9 exs., 96-109 mm, F. 350, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 149.0 mm, F. 300, T.V.; 17.2.89, Mouth of Mahanadi at light house side, Paradeep, 1 ex., 145.0 mm, F. 374, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep,

1 ex., 39.0 mm, F. 403, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 144.0 mm, F. 324, T.V.; 16.3.91, Paradeep, 3 exs., 52.0-101.0 mm, T.V.; 17.3.91, Mangrove forest, Paradeep, 1 ex., 60 mm, F.506, T.V.; 21.3.91, Mangrove forest, Paradeep, 8 exs., 62.0-83.0 mm, T.V.

Diagnosis : Pelvic fins normal; body uniform in colouration; back light brown and belly whitish.

Distribution : Indo-west Pacific.

Remarks : It grows to 30 cm. It is an important food fish.

Family CARANGIDAE

Genus *Alepes* Swai

Alepes djedaba (Forsk.)

1775. *Scomber djedaba* Forskal, *Descript Animal* : 56 (type-locality : Djedda, Red Sea).
 1876. *Caranx djeddaba* : Day, *Fishes of India* : 218, pl. 49, fig. 3.
 1984. *Alepes djedaba* : Talwar and Kacker, *Comm. Sea Fish. India*, 438-439, fig. 168.

Common Names : Djeddaba crevalle (Eng.).

Material : 14.2.89, Mahanadi mouth near Paradeep, 1 ex., 57.0 mm, F. 587, T.V.; 17.2.89, Mahanadi mouth near Paradeep, 4 exs., 55-60 mm, F. 584, T.V.; 18.2.89, Mahanadi mouth near Paradeep, 2 exs., 110-120 mm, F.552, T.V.; 20.2.89, Mahanadi mouth at Paradeep, 1 ex., 103.0 mm, F. 456, T.V.; 16.10.90, Mahanadi mouth Paradeep, 1 ex., 185.0 mm, T.V.; 21.3.91, Mangrove forest, Paradeep, 1 ex., 110.0 mm, T.V.

Diagnosis : Spinous dorsal fin pale. Lateral line strongly arched anteriorly to below 2nd and 4th soft dorsal ray; dorsal and ventral profiles of body evenly convex. A dusky spot on upper edge of operculum.

Distribution : Indo-west Pacific.

Alepes para (Cuvier)

1833. *Caranx para* Cuvier, *Hist. nat. Poiss.*, 9 : 58 (type-locality : Malabar).
 1856. *Caranx kalla* : Day, *Fishes of India*, 219, pl. 49, fig. 5.
 1984. *Alepes para* : Talwar and Kacker, *Comm. Sea Fish. India* : 440-441.

Common Names : Goggle-eye scad (Eng.).

Material : 12.2.89, Mahanadi mouth of Paradeep, 1 ex., 70 mm, F.316, T.V.; 21.2.89, Devi river at Ashtaranga, 1 ex., 65 mm, F. 513, T.V.; 22.3.89, Mangrove forest, Paradeep, 1 ex., 49 mm, T.V.

Diagnosis : Spinous dorsal fin pale. Lateral line moderately arched anteriorly to below

4 to 6th soft dorsal ray; ventral profile of body much more convex than its dorsal profile. A conspicuous black spot on operculum.

Distribution : Indo-Pacific.

Remarks : Grows upto 15 cm.

Genus *Alectis* Rafinesque

Alectis indicus (Ruppell)

1828. *Scyris indicus* Ruppell, *Atlas Nordl Afrika Fische Rothen Meeres* : 128, pl.33, fig. 1 (type-locality : Djedda, Red sea).
 1872. *Caranx gallus* : Day, *Fishes of India* : 224, pl. 51, fig. 3.
 1984. *Alectis indicus* : Talwar and Kacker, *Comm. Sea Fish. India*, 435-436, fig. 167.

Common Names : Indian threadfin trevally (Eng.); Gurrah-parah (Telugu).

Material : 20.2.90, Devi river near Ashtaranga, 1 ex., 97.0 mm, F.718, C.A.N.Rao.

Diagnosis : Body superficially naked, the scales minute and embedded in skin; first dorsal fin with 6 small spines, not connected by a membrane; dorsal and anal fin lobes extremely long and filamentous especially in juveniles.

Distribution : Indo-west Pacific.

Remarks : It grows upto 60 cm.

Genus *Atropus* Oken

Atropus atropus (Bloch)

1801. *Brama atropus* Bloch, *Syst. Ichth* : 98 (type-locality : Tranquebar).
 1876. *Caranx atropus* : Day, *Fishes of India*, 221.
 1984. *Atropus atropus* : Talwar and Kacker, *Comm. Sea Fish, India* : 442-443, fig. 170.

Common Names : Kuweh trevally (Eng.).

Material : 17.2.89, Mahanadi mouth opposite Paradeep, 1 ex., 72.0 mm, F.377, T.V.; 21.2.89, Devi river near Ashtaranga, 1 ex., 70 mm, F. 518, T.V.; 17.3.91, Mangrove forest near Paradeep, 2 exs., 42-60 mm, F.499, T.V.; 22.3.91, Mangrove forest near Paradeep, 1 ex., 35.0 mm, T.V.

Diagnosis : No finlet in dorsal and anal fins. Body with small scales not embedded in skin; first dorsal fin with 7 or 8 spines, connected by a membrane; none of anterior soft rays of dorsal or anal fins as long as body depth. A groove along belly (accommodating pelvic fins, anus and anal-fin spines). Pelvic fin deep black.

Distribution : Indo-Pacific.

Remarks : It grows upto 25 cm.

Genus *Carangoides* Bleeker

Carangoides malabaricus (Bloch)

1801. *Scomber malabaricus* Bloch, Syst. Ichth : 31 (type-locality : Tranquebar).
 1876. *Caranx malabaricus* : Day, *Fishes of India*, 221, pl. 50, fig. 2.
 1984. *Carangoides malabaricus* : Talwar and Kacker, *Comm. Sea Fish India* : 453-455, fig. 175, one plate.

Common Names : Malabar trevally (Eng.); Para (Telugu).

Material : 21.2.89, R. Devi at Ashtaranga, 6 exs., 50-60 mm, F.530, T.V.; 16.3.91, Mahanadi mouth of light house, Paradeep, 1 ex., 70.0 mm, T.V.; 22.3.91, Mangrove Forest near Paradeep, 7 exs., 42.0-68.0 mm, T.V.; 21.3.91, Mangrove Forest near Paradeep, 13 exs., 45.0-65.0 mm, F.646, T.V.

Diagnosis : Naked area of breast extending anteriorly above pectoral fin base nearly to lateral line origin as a triangular area bordering pectoral fin base and operculum; dorsal fin with 20 to 23 soft rays, anal fin with 17 to 18 soft rays. Total gill rakers 32 to 38 on first arch. A black blotch on operculum.

Distribution : Indo-west Pacific.

Remarks : Grows upto 15 cm.

Genus *Megalaspis* Bleeker

Megalaspis cordyla (Linnaeus)

1758. *Scomber cordyla* Linnaeus, *Systema Naturae*, 1 (ed-10):298 (type-locality : not given).
 1876. *Caranx rottleri* : Day, *Fishes of India* : 213.
 1991. *Megalaspis cordyla* : Talwar and Jhingran, *Inland Fishes*, 2 : 824.

Common Names : Torpedo scad (Eng.); Thumburda (Oriya); Sora parah (Telugu).

Material : 16.10.90, Mouth of Mahanadi at Paradeep, 1 ex., 200.0 mm, F.644, T.V.;

Diagnosis : Body torpedo-shaped, Posterior part of lateral line with hardened scutes; pectoral fins long and falcate, usually longer than head; pelvic fin present but not in front of vertical from base of pectoral fin. Second dorsal and anal fin with 8 or 9 distinct finlets; lateral line with 53 to 58 scutes; a black opercular spot.

Distribution : Indo-west Pacific.

Remarks : It grows upto 50 cm.

Genus *Scomberoides* Lacepede*Scomberoides lysan* (Forsk.)

1775. *Scomber lysan* Forskal, *Descript Animal* : 54 (type-locality : Djedda and Lohaja, Red Sea).
 1876. *Chorinemus sancti-petri* : Day, *Fishes of India* : 230.
 1991. *Scomberoides lysan* : Talwar and Jhingran, *Inland Fishes*, 2 : 825.

Common Names : Double spotted queen fish (Eng.). Khadisa, Parei (Oriya).

Material : 21.2.89, Devi river mouth near Ashtaranga, 3 exs., F.527, T.V.; 22.3.91, Mangrove forest near Paradeep, 3 exs., 38.0-42.0 mm, T.V.

Diagnosis : Total gill rakers 21 to 27; distal half of dorsal fin lobe abruptly and heavily pigmented; scales lanceolate; double series of 6 to 8 dusky, roundish blotches above and below lateral line, occasionally joined above and below lateral line; tip of second dorsal fin abruptly and heavily pigmented.

Distribution : Indo-west Pacific.

Scomberoides tala (Cuvier)

1831. *Chorinemus tala* Cuvier, *Hist. nat. Poiss.*, 8 : 377 (type-locality : Malabar).
 1876. *Chorinemus tala* : Day, *Fishes of India* : 231.
 1876. *Chorinemus toloo* : Day, *Fishes of India* : 232, pl. 51A, fig. 3.
 1984. *Scomberoides tala* : Talwar and Kacker, *Comm. Sea Fish. India* : 478-479.

Common Names : Deep Queen fish (Eng.); Tollo-parch (Telugu).

Material : 19.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 145.0 mm, F.411, T.V.

Description : Total gill rakers 8 to 15; dorsal fin lobe uniformly pigmented; vertical elongate blotches intersecting lateral line; upper jaw extends slightly beyond posterior margin of eye; scales lanceolate.

Distribution : Indo-Australian Archipelago.

Remarks : Gill rakers 19 in the present specimen against above 21 in normal forms.

Family LEIOGNATHIDAE

Genus *Gazza* Ruppell*Gazza minuta* (Bloch)

1797. *Scomber minutus* Bloch, *Ichthyologie* : 110, pl. 429, fig. 2 (type-locality : Malbar, India).
 1876. *Gazza minuta* : Day, *Fishes of India*, 224, pl. 53, fig. 1.

1876. *Gazza equulaeformis* : Day, *Fishes of India*, : 244.
 1889. *Gazza argentaria* : Day, *Fauna Brit. India, Fishes*, 2 : 195.
 1991. *Gazza minuta* : Talwar and Jhingran, *Inland Fishes*, 2 : 827-828.

Common Names : Tooth pony (Eng.).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 5 exs., 48-67 mm, F.430, T.V.;
 15.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 30.0-33.0 mm, F.633, T.V.; 17.2.89, Mouth
 of Mahanadi at Paradeep, 1 ex., F.556, T.V.

Diagnosis : Canine teeth present anteriorly on each jaw; mouth parts protract forward.
 Distinct caniniform teeth on both jaws, upper jaw with the symphyseal canines, teeth in lower
 jaw becoming caniniform anteriorly. Scales on body except on breast. Vertical wavy lines on
 upper part.

Distribution : Indo-west Pacific.

Remarks : This is abundant in estuaries.

Genus *Leiognathus* Lacepede

Leiognathus bindus (Valenciennes)

1835. *Equula bindus* Valenciennes, *Hist. nat. Poiss.*, 10 : 78 (on 'Bindoo-Karah' of Russel,
 1803 ex., Vizagapatnam).
 1876. *Equula bindus* : Day, *Fishes of India* : 240.
 1991. *Leiognathus bindus* : Talwar and Jhingran, *Inland Fishes*, 2 : 829, fig. 256.

Common Names : Orangefin pony fish. (Eng.); Bindoo-karah (Telugu).

Material : 11.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 81.0 mm, F. 386, T.V.

Diagnosis : Single row of uniform conical teeth on each jaw; dorsal fin with an orange
 blotch. Grey irregular vermiculate lines on back. Ventral profile of body distinctly more convex
 than its dorsal profile.

Distribution : Indo-west Pacific.

Remarks : Attains 10 cm.

Leiognathus blochii (Valenciennes)

1835. *Equula blochii* Valenciennes, *Hist. nat. Poiss.*, 10 : 84 (type-locality ; Malabar).
 1876. *Equula blochii* : Day, *Fishes of India* : 241, pl. 52, fig. 5.
 1991. *Leiognathus blochii* : Talwar and Jhingran, *Inland Fishes*, 2 : 830.

Common Names : Shortnose pony fish (Eng.).

Material : 21.2.89, Devi river mouth near Ashtaranga, 3 exs., 35-45 mm, F. 523, T.V.; 17.3.91, Mangrove forest near Paradeep, 3 exs., 35-42 mm, F.504, T.V.; 21.3.91, Mangrove forest near Paradeep, 4 exs., 34.0-46.0 mm, F.651, T.V.; 22.3.91, Mangrove forest near Paradeep, 3 exs., 33.0-35.0 mm, T.V.

Diagnosis : Narrow band of villiform teeth on each jaw. Gill rakers much less in length to gill lamellae. A brown blotch on nape. Breast scales. A jet black blotch on spinous dorsal.

Distribution : India, Gulf of Thailand, Borneo, the Philippines and northern Australia.

***Leiognathus brevirostris* (Valenciennes)**

1835. *Equula brevirostris* (Valenciennes, *Hist. nat. Poiss.*, 10 : 83 (type-locality : Malabar).
 1876. *Equula brevirostris* : Day, *Fishes of India* : 241.
 1984. *Leiognathus brevirostris* : Talwar and Kaçker, *Comm. Sea, Fish. India* : 506-507, fig. 196.

Common Names : Shortnose pony fish (Eng.).

Material : 16.3.91, Mouth of Mahanadi, light house side, Paradee, 1 ex., 42.0 mm, F. 620, T.V.; 17.3.91, Mangrove forest near Paradeep, 1 ex., F.505, T.V.

Diagnosis : Dorsal and ventral profiles more or less equally convex. Cleft of mouth opposit lower border of eye. Teeth small, in a single row in both jaws. A dark saddleshaped, blot on nape. Brownish vertical irregular markings on back. A yellow narrow stripe along lateral line.

Distribution : Seas of India, Sri Lanka, through the east Indies, to China and the Philippines.

Remarks : Grows upto 105 cm.

***Leiognathus equulus* (Forsk.)**

1775. *Scomber equula* Forskal, *Descript Animal* 75 (type-locality : Red Sea).
 1876. *Equula edentula* : Day, *Fishes of India* : 238, pl. 52, fig. 1.
 1991. *Leiognathus equulus* : Talwar and Jhingran, *Inland Fishes*, 2 : 831-832.

Common Names : Common ponyfish (Eng.); Tanka-chandee (Oriya).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 73.0 mm, F.431, T.V.; 21.2.89, Devi river near Ashtaranga, 1 ex., 70.0 mm, F. 574, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 2 exs., 77-80 mm, F.325. T.V.

Diagnosis : Narrow band of villiform teeth on each jaw, Dorsal profile of body strongly arched. Cleft of mouth below spinous dorsal. Breast naked. Grey brown vertical lines on upper part of body.

Distribution : Indo-west pacific.

***Leiognathus jonesi* James**

1971. *Leiognathus jonesia* James, *J.mar.biol. Ass. India*, 11 : 316, fig. 1.
 1984. *Leiognathus jonesi* : Talwar and Kacker, *Comm. Sea Fish. India* : 512-514.

Common Names : Jones ponyfish (Eng.).

Material : 22.2.89, Devi river mouth near Ashtaranga, 3 exs., 48-56 mm, F.319, T.V.

Diagnosis : Dusky blotch on upper third of spinous dorsal fin; Pelvic fins not reaching to anal fin. Ridge on lower arm of pre-operculum smooth; dorsal fin spines rather weak. Body with brownish zigzag lines on back. Tip of snout dusky.

Distribution : Palk Bay, Gulf of Manner, Mahanadi estuary and Andamans.

Remarks : It is the first record of this species from this area. It shows the range of distribution extended from far south to Mahanadi estuary in north.

Genus *Secutor* Gistel***Secutor insidiator* (Bloch)**

1787. *Zeus insidiator* Bloch, *Naturges. Fishes*, 3 : 41, pl. 192, figs. 2 and 3 (type-locality : Surat).
 1876. *Equula insidiatri* : Day, *Fishes of India* : 242, pl. 51c, fig. 5.
 1991. *Secutor insidiator* : Talwar and Jhingran, *Inland Fishes*, 2 : 833.

Common Names : Pugnose pony-fish (Eng.); Chandee (Oriya).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 43.0 mm, F.421, T.V.; 12.2.89, Mouth of Mahanadi at Paradeep, 19 exs., 39-64 mm, F.305, T.V.; 13.2.89, Saharabedi river near Poddampur, 2 exs., 40-41 mm, F.446, T.V.; 14.2.89, Mouth of Mahanadi at Paradeep, 19 exs., 46-61 mm, F.591, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 47.0 mm, F.296, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 50 mm, F.563, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 50-58 mm, F.550, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 24 exs., 38-64 mm, F.580, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 30.0 mm, F. 415, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 4 exs., 36-61 mm, F.361, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 35.0 mm, F. 467, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 2 exs., 50-57 mm, F.331, T.V.; 5.12.89, Mouth of Mahanadi at Paradeep, 2409 exs., 19-44 mm, F. 762, DSM.; 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 14 exs., 39.0 mm, F. 608, T.V.; 21.3.91, Mangrove forest, Paradeep, 1 ex., 35.0 mm, F. 649, T.V.

Diagnosis : Body more slender, its depth 2.0 to 2.3 time in standard length; maxilla tip reaching well below level of lower margin of eye; blue spots on back forming vertical bands; tip of dorsal fin black; pectoral axil yellow, with dark dots.

Distribution : Indo-west Pacific.

***Secutor ruconius* (Hamilton)**

1822. *Chanda ruconius* Hamilton, *Fishes of Ganges* : 106, 371, pl. 12., fig. 35 (type-locality : estuaries of Ganges).
 1876. *Equula ruconius* : Day, *Fishes of India* : 242, pl. 51c, fig. 4.
 1991. *Secutor ruconius* : Talwar and Jhingran, *Inland Fishes, 2* : 833-834.

Common Names : Deep pug-nose pony fish (Eng.).

Material : 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 2 exs., 28.0-41.0 mm, F. 623, T.V.

Diagnosis : Body deep, its depth 1.5 to 1.8 times in standard length; maxilla tip reaching to about level of lower margin of eye; lateral line ending below about middle of soft dorsal fin; blue spots on upper half of body; tip of dorsal fin black; pectoral fin axil black.

Distribution : Indo-west Pacific.

Remarks : It attains 12 cm.

Family LUTJANIDAE

Genus *Lutjanus* Bloch

***Lutjanus Johni* (Bloch)**

1792. *Anthias johni* Bloch, *Naturges, Ausland, Fische*, (6):113, 318 (type-locality : Surat, India).
 1875. *Lutjanus johni* : Day, *Fishes of India*. 42, pl. 13. fig. 1.
 1991. *Lutjanus johni* : Talwar and Jhingran, *Inland Fishes, 2* : 835-836.

Common Names : John's snapper (Eng.); Rangu (Telugu).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 3 exs., 64-103 mm, F.433, T.V.; 12.2.89, Paradeep, Mouth of Mahanadi, 1 ex., 115.0 mm, T.V.; 13.2.89, Saharbedi river near Poddampur, 1 ex., 55.0 mm, F.442, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 2 exs., 65-112 mm, F.543, T.V.; 5.12.89, Mahanadi mouth at Paradeep, 3 exs., 30-79 mm, F.766, DSM.; 26.7.90, Battighara, Paradeep, 1 ex., 31.0 mm., 21.2.89, Mangrove forest, Paradeep, 2 exs., 48.0-50.0 mm, ; 12.2.92, Mouth of Mahanadi at Paradeep, 1 ex., 70 mm, F.307, T.V.; 5.3.92, Mouth of Mahanadi, Light house side, Paradeep, 1 ex., 70.0 mm, F.668, T.V.; 9.3.92, Hukitola, 1 ex., 100 mm, F. 660, T.V.; 9.3.92, Hukitola, Paradeep, 4 exs., 66.0-100.0 mm, T.V.

Diagnosis : Body compressed. Jaws with several enlarged canine on each scale forming series of dark streaks. A large black blotch above lateral line at junction of spinous and soft parts of dorsal fin.

Distribution : Indo-west Pacific.

Family GERRIDAE

Genus *Gerres* Cuvier*Gerres filamentosus* Cuvier

1829. *Gerres filamentosus* Cuvier, *Regne Animale*, (2nd ed.), 2:188 (on 'Wodowahal' of Russel, 1803, ex. Vizagapatnam).
 1875. *Gerres filamentosus* : Day, *Fishes of India* : 98, pl. 25, fig. 3.
 1991. *Gerres filamentosus* : Talwar and Jhingran, *Inland Fishes. 2* : 841-842.

Common Names : Whiptail silver-biddy (Eng.); Jagili (Oriya); Jaggari (Telugu).

Material : Mouth of Mahanadi, Light House side, Paradeep, 1 ex., 70.0 mm, F. 616, T.V.; 21.2.89, Devi river mouth Ashtaranga, 1 ex., 89.0 mm.

Diagnosis : Second dorsal spine greatly elongated, produced into a filament, much longer than head. Predorsal distance equal to less than depth of body; 7 to 10 columns of ovoid spots on upper portion of sides.

Distribution : Indo-west Pacific.

Remarks : It attains about 23 cm.

Gerres limbatus Cuvier

1830. *Gerres limbatus* Cuvier, *Hist. nat. Poiss.*, 6 : 476 (type-locality : Malabar and Pondichery).
 1875. *Gerres limbatus* : Day, *Fishes of India* : 100.
 1984. *Gerres limbatus* : Talwar and Kacker, *Comm. Sea Fish. India* : 582.

Common Names : Black-tipped mojarra (Eng.).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 9, exs., 72-99 mm, F.429, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 88.0-90.0 mm, F.297, T.V.; 21.2.89, Devi river at Ashtaranga, 1 ex., 97.0 mm, F.539, T.V.;

Diagnosis : Second dorsal spines not forming a long filament, usually much less than head length. Body relatively deep. Its depth 2.0 to 2.8 time in standard length. Scales 4 rows between lateral line and dorsal fin origin. 3 faint grey vertical bands below dorsal fin.

Distribution : Seas of India.

Gerres oblongus Cuvier

1830. *Gerres oblongus* Cuvier, *Hist. nat. Poiss.*, 6 : 479 (type-locality : Ceylon).
 1875. *Gerres oblongus* : Day, *Fishes of India* : 98, pl. 25, fig. 21.
 1984. *Gerres oblongus* : Talwar and Kacker, *Comm. Sea Fish. India* : 584.

Common Names : Oblong mojarra (Eng.).

Material : 13.2.89, Devi river near Ashtaranga, 1 ex., 57.0 mm, F. 367, T.V.; 5.12.89, Mahanadi mouth near Paradeep, 1 ex., 43 mm, F. 768, DSM.; 26.7.90, Battighara, Paradeep, 1 ex., 35.0 mm.

Diagnosis : Second dorsal spine not produced into a filament, usually much shorter than head, Body elongate, its depth at least 3 times in standard length. Dorsal fin with faint dark markings.

Distribution : Indo-west Pacific.

Family POMADASYIDAE

Sub Family PLECTORHYNCHINAE

Genus *Plectorhynchus* Lacepede

Plectorhynchus nigrus (Cuvier)

1830. *Pristipoma nigrum* Cuvier, *Hist. nat. Poiss.*, 5 : 258 (type-locality : Manila, Philippines).

1875. *Diagramma crassipinum* : Day, *Fishes of India*, 78, pl. 20, fig. 4.

1984. *Plectorhynchus nigrus* : Talwar and Kacker, *Comm. Sea Fish, India* : 593-594.

Common Names : Black sweetlip (Eng.).

Material : 19.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 52.0 mm, F. 414, T.V.

Diagnosis : Dorsal fin with 14 spines and 15 or 16 soft rays, the spines strong; body uniformly dark, no cross bars.

Distribution : Indo-west Pacific.

Remarks : Grows upto 65 cm. A good food fish.

Sub Family POMADASYNAE

Genus *Pomadasys* Lacepede

Pomadasys argenteus (Forsk.)

1775. *Sciaena argentea* Forskal, *Descript Animalium* : 51 (type-locality : Djedda, Arabia).

1875. *Pristipoma argenteum* : Day, *Fishes of India* 74, pl. 8, fig. 3.

1875. *Pristipoma hasta* : Day, *Fishes of India* : 73, pl. 19, fig. 4.

1991. *Pomadasys argenteus* : Talwar and Jhingran, *Inland Fishes*, 2 : 844.

Common Names : Silver grunt (Eng.); Karuppi (Telugu).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 65-70 mm, F. 422, T.V.; 13.2.89, Saharbedi river near Poddampur, 1 ex., 59 mm, F. 445, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 51.0 mm, F. 629, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 2 exs., 79-44 mm, F. 541, T.V.; 21.2.89, Devi river near Ashtaranga, 2 exs., 72-82 mm, F. 572, T.V.

Diagnosis : Lateral line scales 45. Body and fins with scattered round spots, not forming regular wavy lines, spots present on head and snout also; irregular longitudinal streaks on alternate scale rows.

Distribution : Indo-west Pacific.

***Pomadasys kaakan* (Cuvier)**

Material : 11.3.92, Mangrove forest near Paradeep, 1 ex., 55.0 mm, F. 746, T.V.

***Pomadasys maculatus* (Bloch)**

1797. *Anthias maculatus* Bloch, *Naturges ausland. Fishes*, 7 : 9, pl. 326, fig. 2.
 1875. *Pristipoma maculatum* : Day, *Fishes of India* : 74, pl. 19, fig. 5.
 1984. *Pomadasys maculatus* : Day, *Fishes of India* : 74, pl. 19, fig. 5.

Common Names : Blotched grunt (Eng.); Caripe (Telugu).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 3 exs., 50-60 mm, F.376, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 63-78 mm, F. 558, T.V.; 19.2.89, Mouth of Mahanadi at light house side, Paradeep, 1 ex., 40 mm, F.396, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 45.0-78 mm, F.420, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 57.0 mm, F. 352, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 64.0 mm, F. 330, T.V.; 20.2.90, Devi river near Ashtaranga, 1 ex., 95.0 mm, F. 715, CANR.

Diagnosis : Anal with 3 spines the second spine longer than third spine, lateral line with 48 to 54 scales, black blotches present on nape and back; a large black blotch on spinous portion of dorsal fin.

Distribution : Indo-west Pacific.

Remarks : It grows upto 41 cm.

Family SPARIDAE

Genus *Acanthopagrus* Peters

***Acanthopagrus latus* (Houttuyn)**

1782. *Sparus latus* Houttuyn, *Verh. Holland. Maatsch. Wet. Haarlem*, 20 : 322 (type-locality : Japan).
 1875. *Chrysophrys datnia* : Day, *Fishes of India* : 140, pl. 34, fig. 1.
 1991. *Acanthopagrus latus* : Talwar and Jhingran, *Inland Fishes*, 2 : 847-848.

Common Names : Yellow Sea bream (Eng.); Kala Khuranti (Oriya).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 ex., 50 mm, F. 521, T.V.; 22.3.91, Mangrove forest near Paradeep, 1 ex., 43.0 mm, T.V.

Diagnosis : No dark bars across head; anal fin with 8 or 9 soft rays. Anal and lower caudal fins yellow; scales on body with dark bases and silvery edges. A dark spot at origin of lateral line.

Distribution : Indo-west Pacific.

Remarks : It grows to 15 cm. It is also common in the Chilka lake (Talwar and Jhingran, 1991).

Family SCIAENIDAE

Genus *Dendrophysa* Trewawas

Dendrophysa russelli (Cuvier)

1830. *Umbrina russelli* Cuvier, *Hist. nat. Poiss.*, 5 : 178 (type-locality : Vizagapatnam).

1876. *Sciæna russelli* : Day, *Fishes of India* : 183, pl. 43, fig. 4.

1991. *Dendrophysa russelli* : Talwar and Jhingran, *Inland Fishes*, 2 : 854.

Common Names : Goatee croaker (Eng.).

Material : 21.2.89, Devi river near Ashtaranga, 2 exs., 102-105mm, F.537, T.V.

Diagnosis : Anterior pair of appendages of gas bladder extending into head and braching under the skull. Lower jaw with a single mental barbel; lower jaw teeth uniform in size.

Distribution : South-west and east coast of India, Andamans, Sri Lanka, through the East Indies, to the Phillipines, China and Australia.

Remarks : It attains 25 cm.

Genus *Johnius* Bloch

Johnius volgeri (Bleeker)

1853. *Otolithus vogleri* Bleeker, *Tat. Tijdschr. Ned. India*, 4 : 253 (type-locality : Sumatra).

1876. *Sciæna vogleri* : Day, *Fishes of India* : 186, pl. 45, fig. 1.

1984. *Johnius vogleri* : Talwar and Kacker, *Comm. Sea Fish. India*, 654-655, fig. 260.

Common Names : Sharp-toothed hammer croaker (Eng.).

Material : 14.2.89, 1 ex., Mouth of Mahanadi, Paradeep, 101.0 mm, 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 98.0 mm, F.463, T.V.; 21.2.89, Devi river near Ashtaranga,

1 ex., 93.0 mm, F.540, T.V.; 21.2.89, Devi river near Ashtaranga, 2 exs., 82.88 mm, F.571, T.V.

Diagnosis : No barbel on chin. Mouth subterminal. Teeth in lower jaw more or less enlarged, spaced; Gill rakers 9 to 12 on lower arm of first arch. Snout rounded but not projecting caudal fin rhomboid. Scales cycloid on head, ctenoid on body; scaly sheath on lower parts of dorsal and anal fins.

Distribution : India, Sri Lanka, through the East Indies to the Phillippines, and Australia.

Remarks : It is common in commercial catches.

Johnius carouna (Cuvier)

1830. *Corvina carouna* Cuvier, *Hist. nat. Poiss.* 5 : 125 (type-locality : Malabar).

1876. *Sciaena carutta* : Day, (partim), *Fishes of India* : 192.

1991. *Johnius carouna* : Talwar and Jhingran, *Inland Fishes*, 2 : 857.

Common Names : Caroun croaker (Eng.).

Material : 22.2.89, Devi river near Ashtaranga, 1 ex., 150.0 mm, F. 338, T.V.

Diagnosis : Scales on occiput and whole body (except breast) ctenoid; lateral line devoid of a distinct silvery streak; snout steeply curved, not or very slightly projecting in front of upper jaw. Dorsal fin with 10 spines. Lateral line scales 46 to 49.

Distribution : India.

Remarks : It attains 10 cm.

Johnius carutta Bloch

1793. *Johnius carutta* Bloch, *Naturges. ausland. Fische* (7) : 133, pl. 356, (type-locality : Tranquebar, Tamilnadu).

1876. *Johnius carutta* : Day, (partium), *Fishes of India* : 192.

1991. *Johnius carutta* : Talwar and Jhingran, *Inland Fishes*, 2 : 857-858.

Common Names : Karut croaker (Eng.); Gorasa (Telugu).

Material : 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 79.0 mm, F. 351, T.V.

Diagnosis : Scales on head and breast cycloid, and most of body scales are either cycloid or have a feebly ctenoid zone; lateral line conspicuous silvery with a yellow streak; interorbital width about 11 times in standard length; Lateral line scales 48 to 50. No barbel on chin. Mouth ventral.

Distribution : Pakistan, India, Sri Lanka, and eastwards to the Malay Peninsula and Thailand.

Remarks : It attains 12 cm.

***Johnius coitor* (Ham Buch)**

1822. *Bola coitor* Hamilton, *Fishes of Ganges* 75, 368, pl. 27, fig. 24 (type-locality : Ganga river).
 1876. *Scialna coitor*, Day, *Fishes of India* : 187, pl. 46, fig. 3.
 1991. *Johnius coitor*, Talwar and Jhingran, *Inland Fishes*, 2 : 858.

Common Names : Coitor croaker (Eng.).

Material : 17.2.89, Mouth of Mahanadi, Paradeep, 1 ex., 132 mm, T.V.

Diagnosis : Scales on occiput and whole body (except breast) ctenoid; lateral line devoid of a distinct silvery streak; snout conspicuously prominent and projecting, about 1.5 times in eye diameter.

Distribution : East Coast of India, Bangladesh, Burma, through the East Indies, to the coast of Australia.

Remarks : It attains 18 cm.

Family MULLIDAE

Genus *Upeneus* Cuvier

***Upeneus (Pennon) tragula* Richardson**

1846. *Upeneus tragula* Richardson, *Ichty. China Japan* : 220 (type-locality : Canton).
 1875. *Upeneoides tragula* : Day, *Fishes of India* : 121, pl. 30, fig. 40.
 1984. *Upeneus (Pennon) tragula* : Talwar and Kacker, *Comm. Sea Fish, India*, 682-683, fig. 276.

Common Names : Dark band goat fish (Eng.).

Material : 21.2.89, Devi river near Ashtaranga, 1 ex., 97.0 mm, F.577, T.V.

Diagnosis : Lateral line scales 33 to 34; chin with two short, thin barbels; head distinctly longer than caudal fin length; scales of back and upper sides of body with brown or reddish spots forming regular longitudinal lines; both dorsal fins with horizontal brown or reddish stripes; caudal fin with brown or red cross bars; barbels yellow.

Distribution : Indo-west Pacific.

Remarks : Barbels very long reaching to beyond preopercular margin.

***Upeneus (Upeneus) vittatus* (Lacepede)**

1801. *Mullus vittatus* Lacepede, *Hist. nat. Poiss.*, 3 : 382, 401 (type-locality : unknown).

1876. *Upeneoides vittatus* : Day, *Fishes of India*: 120, pl. 30, fig.2.
 1984. *Upeneus (Upeneus) vittatus* : Talwar and Kacker, *Comm. Sea Fish. India* : 686-687. fig. 279.

Common Names : Yellow striped goat fish (Eng.).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 102. mm, F.428, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 100 mm, F. 385, T.V.; 11.2.89, Paradeep, Mouth of Mahanadi 1 ex., 104.0 mm, T.V.

Diagnosis : Pelvic fins short, about 2/3 rds the length of pectoral fins; first dorsal fin with 3 horizontal stripes; caudal fin with black cross-bars on both lobes; chin with 2 short thin barbels; 3 deep-large longitudinal bands above lateral line and 2 yellow bands below lateral line.

Distribution : Indo-west Pacific.

Remarks : This is common goat fish reaching a length of 30 cm.

Family EPHIPPIDAE

Genus *Platax* Cuvier

Platax pinnatus (Linnalus)

1758. *Chaetodon pinnatus* Linnaeus, *Systema Naturae*, 1 (ed. 10):272 (type-locality : East India).
 1876. *Platax vespertilio* : Day, *Fishes of India*, :235, pl. 51 B, fig. 4.
 1984. *Platax pinnatus* : Talwar and Kacker, *Comm. Sea Fish India* : 702-703, fig. 285.

Common Names : Round bat fish (Eng.); Kahi sandaava, Kaki chanduva (Telugu).

Material : 12.2.89, Mouth of Mahanadi at light house side, Paradeep, 1 ex., 73.0 mm, T.V.

Diagnosis : Spinous dorsal fin confluent with soft-rayed portion, with no notch; spines of dorsal fin increasing in length posteriorly. Body compressed rounded in out-line. Pelvic fins well developed, the first soft ray extending to at least the anal fin. Caudal truncate. 3 black vertical bands. colour blackish.

Distribution : Indo-Pacific.

Remarks : This is of minor commercial significance.

Family SCATOPHAGIDAE

Genus *Scatophagus* Cuvier*Scatophagus argus* (Linnaeus)

1766. *Chaetodon argus* Linnaeus, *Systema Naturae*, (ed. 12), 1 : 464 (type-locality : India).
 1875. *Scatophagus argus* : Day, *Fishes of India* : 114, p.29, fig. 3.
 1991. *Scatophagus argus* : Talwar and Jhingran, *Inland Fishes*, 2 : 875-876.

Common Names : Spotted scat, Spotted butter fish (Eng.); Chitrillo, Eesputti (Telugu).

Material : 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 118.0 mm, F.336, T.V.

Diagnosis : Body squarish in out-line, with bluntly pointed and triangular head; mouth small, teeth small, movable, tricuspid in bands in jaws. Dorsal fin notched. Body with irregular large round brown spots.

Distribution : India, Sri Lanka, through the East Indies, to China, Taiwan, the Philippines, Melanesia, Polynesia and Australia.

Remarks : It attains 30 cm. It is an aquarium fish.

Suborder MUGILOIDEI

Family MUGILIDAE

Genus *Liza* Jordan & Swain*Liza macrolepis* (Smith)

1849. *Mugil macrolepis* Smith, *Illustr. Zool S. Africa*, 4:pl. 28, fig. 2 (type-locality : rivers and lakes of S. Africa).
 1876. *Mugil poecilus* : Day, *Fishes of India* : 351, pl. 75, fig. 4.
 1876. *Mugil borneensis* : Day, *Fishes of India* : 357, pl. 76, fig. 1.
 1991. *Liza macrolepis* : Talwar and Jhingran, *Inland Fishes*, 2 : 891-892.

Common Names : Largescale mullet, Borneo mullet (Eng.).

Material : 13.2.89, Devi river mouth near Sonadhara, 10 exs., 69.98 mm, F. 370, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 69.0 mm, F. 356, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 10 exs., F.515, T.V.; 5.12.89, Mahanadi mouth at Paradeep, 1 ex., 53 mm, DSM.; 22.3.91, Mangrove forest, Paradeep, 11 exs., 32.0-48.0 mm, T.V.

Diagnosis : Anal fin rays 9. Back not keeled in front of first dorsal fin. 12 transverse rows of scales; pelvic fins not reaching beyond vertical from base of third spine of first dorsal fin. No elongate pectoral axillary scale. Lateral line scale 31 to 34.

Distribution : India, west Pacific.

Remarks : It attains 28 cm. It forms good fishery in Chilka lake. The fish is tasty known for its oil content.

***Liza parsia* (Hamilton)**

1822. *Mugil parsia* Hamilton, *Fishes of Ganges* : 215, pl. 17, fig. 71 (type-locality : fresh water rivers of Bengal).
 1876. *Murgil parasia* : Day, *Fishes of India* : 350, pl. 75, fig. 20.
 1991. *Liza parsia* : Talwar and Jhingran, *Inland Fishes, 2* : 893-894, fig. 268.

Common Names : Gold spot mullet (Eng.); Dangla, Menjia, Khainga (Oriya); Bonthalu (Telugu).

Material : 21.3.91, Mangrove forest near Paradeep, 8 ex., 40.0-89.0 mm, F. 652, T.V.; 24.3.91, Mahanadi estuary, light house side, Paradeep, 1 ex., 40.0 mm, F. 692, T.V.

Diagnosis : Second dorsal fin inserted over anterior half of anal fin base. Preorbital filing space between lip and eye; corner of mouth on vertical behind anterior nostril; First dorsal fin origin nearer to snout tip than to caudal fin base. Pectoral axillary scale rudimentary or absent. Dorsal and anal fins densely scaled. A golden spot on upper operculum.

Distribution : Pakistan, India and Sri Lanka.

Remarks : Attains 40 cm. It constitutes 6 to 9% catch in Mahanadi estuary.

***Liza subviridis* (Valenciennes)**

1836. *Mugil subviridis* Valenciennes, *Hist. nat. Poiss. 11* : 115 (type-locality : Malabar).
 1876. *Mugil subviridis* : Day, *Fishes of India* : 353.
 1876. *Mugil dussumieri* : Day, *Fishes of India* : 352, pl. 74, fig. 4.
 1876. *Mugil jerdoni* : Day, *Fishes of India* : 352.
 1991. *Liza subviridis* : Talwar and Jhingran, *Inland Fishes, 2* : 894.

Common Names : Green back mullet (Eng.); Koinga (Telugu).

Material : 11.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 235.0 mm, F. 382, T.V.; 13.2.89, River Saharbedi near Poddampur, 27 exs., 52-105 mm, F. 435, T.V.

Diagnosis : Second dorsal fin inserted over anterior half of anal fin base. Preorbital not filling space between lip and eye; corner of mouth on vertical through anterior nostril. First dorsal fin inserted near to caudal fin base than to snout-tip. Pectoral axillary scale rudimentary or absent. Second dorsal and anal fins densely scaled. 11 scales in transverse series. Greenish above.

Distribution : Persian Gulf, Pakistan, India, Sri Lanka, through East Indies to China, Queensland, and Polynesia.

Remarks : It attains 25 cm.

***Liza tade* (Forsk.)**

1775. *Mugil crenilabis tade* Forskal, *Descript, Animal* : 74 (type-locality : Arabia).
 1876. *Mugil planiceps* : Day, *Fishes of India* 350.
 1876. *Mugil belanak* : Day, *Fishes of India*, 351, pl. 74, fig. 5.
 1889. *Mugil tade* : Day, *Fauna Br. India, Fishes, 2* : 344.
 1991. *Liza tade* : Talwar and Jhingran, *Inland Fishes, 2* : 894-895.

Common Names : Tade mullet (Eng.).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 175.0 mm, F. 310, T.V.

Diagnosis : Second dorsal fin inserted over posterior half of anal base. First dorsal fin inserted nearer to snout tip than to caudal fin base. Pectoral axillary scale rudimentary or absent. Second dorsal and anal densely scaled. 3 to 7 indistinct longitudinal marks on upper half of body.

Distribution : Indo-west Pacific.

Remarks : It contributes a minor fishery in the Mahanadi estuary. It attains 47 cm.

Genus *Mugil* Linnaeus***Mugil cephalus* Linnaeus)**

1758. *Mugil cephalus* Linnaeus, *Systema, Naturae* ed. 10, 1 : 316 (type-locality : European seas).
 1876. *Mugil oeur.* : Day, *Fishes of India* : 353, pl. 75, fig. 3.
 1991. *Mugil cephalus* : Talwar and Jhingran, *Inland Fishes, 2* : 896-897.

Common Names : Flat head mullet (Eng.); Khoigiriga, Kohala (Oriya); Kathi parega (Telugu).

Material : 13.2.89, Devi river mouth near Sonadhara, 1 ex., 67.0 mm, F. 365, T.V.; 13.2.89, Saharbedi river near Poddampur, 2 exs., 48-70 mm, F. 443, T.V.; 17.2.89, Mouth of Mahanadi near Paradeep, 1 ex., T.V.; 5.12.89, Mouth of Mahanadi at Paradeep, 9 exs., 115-145 mm, F. 759, DSM.; 173.91, Mangrove forest near Paradeep, 4 exs., 120-140 mm, F. 503, T.V.

Diagnosis : No spine on operculum; head flattened dorsally; anterior nostrils above level of eye centre; lower third of upper lip without crenulations or papillae; hind tip of maxilla not curved below tip of pre-maxilla; adipose eyelids well developed; lower lip with symphyseal knob, lateral line scales 38 to 42; six or seven indistinct brown bands down flanks; a dark purple blotch at base of pectoral fin.

Distribution : World-wide in temperate and tropical waters.

Remarks : This is the most common species of Mullet.

Genus *Valamugil* Smith*Valamugil buchanani* (Bleeker)

1853. *Mugil buchanani*, Verh. batav. Genoot, Kurst, Wet 25 : 99 (type-locality : Hooghly river, West Bengal)
 1876. *Mugil buchanani* : Day, *Fishes of India* : 358.
 1991. *Valamugil buchanani* : Talwar and Jhingran, *Inland Fishes*, 2 : 901.

Common Names : Blue tail mullet (Eng.).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 140.0 mm, F. 308, T.V.

Diagnosis : Adipose eye-lids feeble; second dorsal and anal fins falcate, longer than pelvic fins; vomer and palatines dentate; scales in lateral line 32 to 36; lower lip with a high double symphyseal knob; pectoral axillary scale elongate; a dark axillary spot on base of pectoral fin; caudal fin brilliant blue.

Distribution : Indo-west Pacific.

Valamugil cunnesius (Valenciennes)

1836. *Mugil cunnesius* Valenciennes, *Hist. nat. Poiss*, 11 : 114 (type-locality : Malabar and Bombay; Moluccas).
 1876. *Mugil cunnesius* : Day, *Fishes of India* : 349, pl. 74, fig. 3.
 1876. *Mugil amarulus* : Day, *Fishes of India* : 356.
 1876. *Mugil kelaarti* : Day, *Fishes of India* : 352, pl. 75, fig. 1.

Common Names : Long arm mullet (Eng.); Kunnessee (Telugu).

Material : 21.2.89, Devi river near Ashtaranga, 1 ex., 99.0 mm, F. 578, T.V.; 24.3.91, Mahanadi mouth near light house side, Paradeep, 1 ex., 79.0 mm, F. 694, T.V.

Diagnosis : Adipose eye-lids well developed; scales in lateral series 30 to 35; second dorsal and anal fins moderately scaled; pectoral axillary scale long; a dark axillary spot; fin tips dark.

Distribution : Indo-west Pacific.

Remarks : It grows upto 30 cm. It contributes to a significant fishery in Mahanadi estuary.

Valamugil seheli (Forsk.)

1775. *Mugil crenilabis seheli*, Forskal *Descript. Animal* : 73 (type-locality : Lohaja, Red Sea).
 1876. *Mugil seheli* : Day, *Fishes of India* : 355.
 1876. *Mugil caeruleomaculatus* : Day, *Fishes of India* : 356.
 1991. *Valamugil seheli* : Talwar and Jhingran, *Inland fishes*, 2: 903.

Common Names : Blue spot mullet (Eng.); Magi (Oriya).

Material : 10.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 67-100 mm, F. 426, T.V.; 13.2.89, Devi river mouth near Ashtaranga, 3 exs., 60-70 mm, F.363, T.V.; 13.2.89, Saharabedi river near Poddampur, 4 exs., 73-113 mm, F. 438, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 2 exs., 91-110 mm, F. 522, T.V., 2 exs., F. 538, T.V.; 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 17 exs., 36.0-83.0 mm, F. 603, T.V.; 21.3.91, 18 exs., Mangrove Forest Paradeep, 51.0-73.0 mm, T.V.; 22.3.91, Mangrove Forest, Paradeep, 2 exs., 47.0-64.0 mm, T.V.

Diagnosis : Adipose eye-lids feeble; a rim around eye; second dorsal and anal fins not falcate, shorter than pelvic fins; vomer and palatines with teeth; lateral line scales 38 to 42; lower lip with high double symphysial knob; pectoral axillary scale long; upper rows of scales with dusky spots forming indistinct bands along body; blue axillary spot, upper lobe of caudal fin with blue tip; second dorsal and caudal fin pale blue.

Distribution : Indo-west Pacific.

Remarks : Grows to 25 cm. in the Chilka Lake.

***Valamugil speigleri* (Bleeker)**

1858. *Mugil speigleri* Bleeker, *Nat. Tijdschr. Ned. Indie*, 16 : 279 (type-locality : Java).
 1876. *Mugil speigleri* : Day, *Fishes of India* : 348, pl. 74, fig. 2.
 1991. *Valamugil speigleri* : Talwar and Jhingran, *Inland Fishes*, 2 : 903-904.

Common Names : Speigler's grey mullet (Eng.); Nakora, Chara (Oriya); Surda, Koinga, Konisalu (Telugu).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 ex., 116.0 mm, F. 598, T.V.

Diagnosis : Adipose eye-lids well developed; lateral line scales 37 to 40; second dorsal and anal fins densely scaled; pectoral axillary scale long; black axillary spot; back green; fins dusky.

Distribution : Pakistan, India, Sri Lanka, Indonesia and Australia.

Remarks : It attains 20 cm.

Suborder SPHYRAENOIDEI

Family SPHYRAENIDAE

Genus *Sphyraena* Rose

***Sphyraena barracuda* (Walbaum)**

1792. *Esox barracuda* Walbaum, *Ichthyologie* (3) : 94 (type-locality : West Indies).
 1876. *Sphyraena commersonii* : Day, *Fishes of India* : 343.

1984. *Sphyraena barracuda* : Talwar and Kacker, *Comm. Sea Fish. India* : 736-737, fig. 298.

Common Names : Great barracuda (Eng.).

Material : 5.12.89, Mouth of Mahanadi at Paradeep, 205 exs., 61-100 mm, F. 755, DSM.; 17.3.91, Mangrove forest near Paradeep, 1 ex., 76.0 mm, F. 507, T.V.

Diagnosis : Gill rakers absent on first arch; lateral line with 75 to 90 pores; body with 18 to 20 inky blotches on posterior part.

Distribution : World-wide.

Remarks : Attains 150 cm. in length.

Sphyraena obtusata Cuvier

1829. *Sphyraena obtusata* Cuvier, *Hist. nat. Poiss.*; 3 : 350, pl. 10, fig. 2 (type-locality : Pondichery).
 1876. *Sphyraena obtusata* : Day, *Fishes of India* : 354, pl. 71, fig. 5.
 1984. *Sphyraena obtusata* : Talwar and Kacker, *Comm. Sea Fish. India* : 742-743, fig. 303.

Common Names : Obtuse barracuda (Eng.); Jellow (Telugu).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 1 exs., 110.0 mm, F. 314, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 118.0 mm, F. 408, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 1 ex., 120 mm, F. 528, T.V.; 16.3.91, Mouth of Mahanadi at light house sides, Paradeep, 6 exs., 70.0-120.0 mm, F. 609, T.V.; 21.3.91, Mangrove forest at Paradeep, 1 ex., 75.0 mm, F. 653, T.V.; 22.3.91, Mangrove forest at Paradeep, 70.0 mm, T.V.

Diagnosis : Snout pointed : Two gill rakers on first arch; pectoral fin reaches past origin of first dorsal fin; height of first dorsal fin equal to or greater than post orbital length; lateral line with 85 to 96 pored scaled.

Distribution : Indo-Pacific.

Remarks : It grows to 23 cm.

Suborder POLYNEMOIDEI

Family POLYNEMIDAE

Genus *Eleutheronema* Bleeker

Eleutheronema tetradactylum (Shaw)

1804. *Polynemus tetradactylus* Shaw, *General Zoology*, 5 : 155 (type-locality : Vigagapatnam).
 1876. *Polynemus tetradactylus* : Day, *Fishes of India* : 180.

1991. *Eleutheronema tetradactylum* : Talwar and Jhingran, *Inland Fishes*, 2 : 907-908, f. 271.

Common Names : Fourfinger threadfin (Eng.).

Material : 11.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 135.0 mm, F. 381, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 1 ex., 111-116 mm, F. 299, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 102.0 mm, F. 407, T.V.; 21.2.89, Devi river mouth, Ashtaranga, Mahanadi, 1 ex., 116.0 mm, T.V.

Diagnosis : Lower lip absent except towards the rictus (mouth corners), teeth extending on exterior part of jaws. Pectoral fin in two parts, upper part with all rays simple (unbranched) and lower part with 4 free filamentous rays.

Distribution : Persian Gulf, Pakistan, India, Sri Lanka, Bangladesh, through the East Indies, to China, the Philippines and north and western Australia.

Remarks : This contributes a good fishery. It is a good food fish.

Genus *Polydactylus* Lacepede

Polydactylus plebeius (Broussonet)

1782. *Polynemus plebeius* Broussonet, *Ichthyologica* : 23, pl. 8 (type-locality : Pacific ocean near Tahiti).
 1876. *Polynemus plabejus* : Day, *Fishes of India* : 179.
 1984. *Polydactylus plebeius* : Talwar and Kacker, *Comm. Sea Fish, India* : 751-752, fig. 307.

Common Names : Common threadfin (Eng.).

Material : 15.2.89, Mouth of Mahanadi at Paradeep, 3 exs., 84-90 mm, F. 290, T.V.

Diagnosis : Pectoral fin with 5 free filamentous rays of which the upper 2 are the longest and reaching to tip of pelvic fins; no dusky shoulder blotch; lateral line scales 60 to 65; Eyes large, 3.8 to 4 times in head; body with dark narrow dusky stipes along scale-rows.

Distribution : Indo-west Pacific.

Polydactylus sextarius (Bloch)

1801. *Polynemus sextarius* Bloch, *Syst. Ichth.* 18, pl. 4 (type-locality : Tranquebar, India).
 1876. *Polynemus sextarius* : Day, *Fishes of India* : 177, pl. 42, fig. 6.
 1991. *Polydactylus sextarius* : Talwar and Jhingran, *Inland Fishes*, 2 : 910-911, fig. 272.

Common Names : Black-spot threadfin (Eng.).

Material : 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 99.0 mm, F. 333, T.V.

Diagnosis : Eyes large, the diameter 3 to 3.8 times in head length; pectoral fin with 6 free filamentous rays of which upper 2 are longest and extend to tip of pelvic fin; a large black blotch at beginning of lateral line.

Distribution : Indo-west Pacific.

Sub Order CALLIONIMOIDEI

Family CALLIONYMIDAE

Genus *Callionymus* Linnaeus

Callionymus fluviatilis Day

1876. *Callionymus fluviatilis* Day, *Fishes of India* : 322 (type-locality : Hooghly river at Calcutta).
 1889. *Callionymus fluviatilis* Day, *Fauna Br. India, Fishes, 2* : 304.
 1983. *Callionymus fluviatilis*, Fricke, *Theses. Zool., 3* : 142, fig. 39.
 1991. *Callionymus fluviatilis*, Talwar and Jhingran, *Inland Fishes, 2* : 916-917. fig. 273.

Common Names : River dragonet (Eng.).

Material : 22.2.89, 2 exs., 42-55 mm, River Devi at Ashtaranga, Coll. T.V.

Diagnosis : Operculum without free flap of skin. Dorsal margin of pre-operculum with large curved spines; main tip curved; second dorsal with 10 rays; dorsal and caudal spotted.

Distribution : East coast of India to Vietnam.

Remarks : It is the first record of this species from Mahanadi estuary. It is of no interest to fisheries.

Callionymus sagitta Pallas

1876. *Callionymus sagitta* : Day, *Fishes of India* ; 322, pl. 68, fig. 5.
 1991. *Callionymus sagitta* : Talwar and Jhingran, *Inland Fishes, 2* : 916.

Common Names : River dragonet (Eng.).

Material : 5.3.92, Mahanadi mouth near light houses, Paradeep, 1 ex., 58.0 mm, F. 661, T.V.

Diagnosis : Gill opening small, superior. Lateral line single. Pre-opercular spine with four or five denticulations internally and one at its base directed forwards. Maxilla does not reach to below orbit.

Distribution : Seas of India and Mauritius.

Remarks : Grows upto 10 cm.

Sub Order GOBIOIDEI

Family GOBIIDAE

Sub Family GOBIINAE

Genus *Acentrogobius* Bleeker*Acentrogobius caninus* (C.V.)

1837. *Gobius caninus* Cuvier and Valenciennes, *Hist. nat. Poiss.* 12, P. 86.

1941. *Acentrogobius caninus*, Koumans, *Mem. Indian, Mus.*, 13 : 228-229.

Material : 5.12.89, Mahanadi mouth at Paradeep, 1 ex., 90 mm, F. 767, DSM.; 9.3.92, Hukitola, 4 exs., 70.0-108.0 mm, F. 662, T.V.;

Diagnosis : 17-20 per dorsal scales. Scapula with blue spot. Large spots on body.

Distribution : Indo-Australian archipelago.

Acentrogobius cyanomos (Bleeker)

1849. *Gobius cyanomos* Bleeker, *Verh. batav. Genoot, Kunst., Wat.*, 22 : 25 (type-locality : Java).

1876. *Gobius cyanomos* : Day, *Fishes of India* : 287, pl. 61, fig. 5.

1991. *Acentrogobius cyanomos* : Talwar and Jhingran, *Inland Fishes*, 2 : 924.

Common Names : Bondu (Telugu).

Material : Mahanadi mouth at Paradeep, 1 ex., 77.0 mm, F. 628, T.V.; 20.2.89, Mahanadi at Paradeep, 1 ex., 63.0 mm, F. 355, T.V.; 11.3.92, Mangrove forest near Paradeep, 7 exs., 49.0-75.0 mm, F. 744, T.V.; 11.3.92, Mangrove forest near Paradeep, 7 exs., 49.0-75.0 mm, F. 749, T.V.

Diagnosis : Scales 26 to 32 in longitudinal series. Predorsal scales 14. A blue blotch on shoulder.

Distribution : India, Thailand and Indo-Australian Archipelago.

Remarks : It attains 10 cm.

Genus *Bathygobius* Bleeker*Bathygobius fuscus* (Ruppell)

1828. *Gobius fuscus* Ruppell, *Atl. Reise N. Afr. Fische* : 137 (type-locality : Red Sea).

1876. *Gobius elegans* (*nec* Valenciennes), Day, *Fishes of India* : 293.

1876. *Gobius albo-punctatus* : Day, *Fishes of India* ; 294.

1991. *Bathygobius fuscus* : Talwar and Jhingran, *Inland Fishes*, 2 : 929.

Common Names : Frill goby. (Eng.).

Material : 5.12.89, Mahanadi mouth at Paradeep, 1 ex., 56 mm, F. 772, DSM.; 26.2.89, Battighara, Paradeep, 1 ex., 37.0 mm.

Diagnosis : A small bump below anterior nostril bordered below by a longitudinal groove. Preopercle toothless. Dorsal fins separate. Upper most pectoral finrays free from membrane near tips; free and silk-like. No tubercles on lips.

Distribution : Indo-west Pacific.

Remarks : Attains 10 cm.

Genus *Favonigobius* Whitley

Favonigobius reichei (Bleeker)

1853. *Gobius reichei* Bleeker, *Natuurk. Tijdschr. Ned. Indie.* 5:509 (type-locality : Padang, Indonesia).
 1868. *Gobius neilli* : Day, *Fishes of India* : 290, pl. 62, fig. 4.
 1991. *Favonigobius reichei* : Talwar and Jhingran, *Inland Fishes*, 2 : 934.

Common Names : Tropical sand goby (Eng.).

Material : 11.3.92, Mangrove forest near Paradeep, 1 ex., 40.0 mm, F. 748, T.V.

Diagnosis : Body elongate, Head slightly depressed. Gill opening extends to below mid-operculum; isthmus very narrow, scaled to below operculum. Mouth oblique, terminal, teeth on jaws in several rows, tongue truncate. No scales on opercle and pre-opercle. Longitudinal scales 26 to 28. Body with spots.

Distribution : Indo-west Pacific.

Remarks : It attains 10 cm.

Genus *Glossogobius* Gill

Glossogobius biocellatus (Valenciennes)

1837. *Gobius biocellatus* Valenciennes, *Hist. nat. Poiss.*, 12:73 (type-locality ; Pondichery).
 1876. *Gobius biocellatus* : Day, *Fishes of India* : 289, pl. 63, fig. 8.
 1991. *Glossogobius biocellatus* : Talwar and Jhingran, *Inland Fishes*, 2 : 935-936.

Common Names : Sleepy goby (Eng.); Dondu (Telugu).

Material : 13.2.89, Devi river near Sonadhara, 2 exs., 83-92 mm, F. 369, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 77.0 mm, F. 357, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 1 ex., F. 510, T.V.; 22.3.91, Mangrove forest, Paradeep, 1 ex., 70.0 mm, ; 23.3.91, Battighara light house, Paradeep, 1 ex., F. 709, T.V.; 5.3.92, Mouth of Mahanadi

light house side, Paradeep, 1 ex., 63.0 mm, F. 669, T.V.; 9.3.92, Hukitola, 1 ex., 54.0 mm, F. 664, T.V.; 11.3.92, Mangrove forest at Paradeep, 14 exs., 50.0-78.0 mm, F. 741, T.V.

Diagnosis : Branchiotegeal membranes from a free fold across isthmus; body dark with many longitudinal lines and saddles on back; iris with a lappet dorsally covering part of pupil. Body dark brown to black with black spots in longitudinal rows. Pelvic fin with dark across bands.

Distribution : Indo-west Pacific.

Remarks : Attains 12 cm. Common in Chilka Lake.

Glossogobius giuris (Hamilton)

1822. *Gobius giuris* Hamilton, *Fishes of Ganges* : 51, pl. 33, fig. 15 (type-locality : Gangatic provinces).
 1876. *Gobius fiuris* : Day, *Fishes of India* : 294, pl. 67, fig. 1.
 1876. *Gobius gutum* : Day, *Fishes of India* : 294.
 1991. *Glossogobius giuris* : Talwar and Jhingran, *Inland Fishes, 2* : 936, fig. 274.

Common Names : Tank goby (Eng.); Isika Dondu (Telugu).

Material : 17.2.89, Mahanadi mouth at Paradeep, 5 exs., 80-90 mm, F.570, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 1 ex., 90.0 mm, F. 520, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 1 ex., F. 575, T.V.; 5.12.89, Mahanadi at Paradeep, 1 ex., F. 774, DSM.; 26.7.90, Battighara light house, Paradeep, 2 exs., 70.0 mm, F.74, T.V.; 19.10.90, Battighara light house, Paradeep, 3 exs., F.711, CANR.; 17.3.91, Mangrove forest at Paradeep, 1 ex., 91.0 mm, F.501, ; 22.3.91, Mangrove forest, Paradeep, 1 ex., 81.0 mm,; 24.3.91, Mahanadi mouth at Paradeep, 10 exs., 80.0 mm, F. 685, T.V.; 11.3.92, Mangrove forest at Paradeep, 3 exs., 80.0-90.0 mm, F. 747, T.V.

Diagnosis : Branchiostegal membranes attached to sides of isthmus; body pale, without longitudinal lines. Iris without a lappet; fine dark blotches on side.

Distribution : Indo-west Pacific.

Remarks : It attains 30 cm.

Genus *Oligolepis* Bleeker

Oligolepis acutipennis (Valenciennes)

1837. *Gobius acutipennis* Valenciennes, *Hist. nat. Poiss. 12* : 80 (type-locality : Malabar).
 1876. *Gobius acutipennis* : Day, *Fishes of India* : 291, pl. 61, fig.2.
 1991. *Oligolepis acutipennis* : Talwar and Jhingran, *Inland Fishes, 2* : 939.

Common Names : Sharptail goby (Eng.).

Material : 5.12.89, Mouth of Mahanadi at Paradeep, 1 ex., 35 mm, F. 773, DSM.; 26.7.90, Bathighara, Paradeep, 1 ex., 33.0 mm, T.V.

Diagnosis : Body elongate and compressed, mouth oblique; tongue largely fused to floor of mouth, its tip free. Soft dorsal fin with 10 or 11 rays, 3rd to 5th prolonged and filamentous in males; Anal fin with 10 or 11 soft rays; scales large, ctenoid; 27 to 30 in longitudinal series; dark blotches along back.

Distribution : Indo-west Pacific.

Remarks : Grows upto 10 cm.

Genus *Oxyurichthys* Bleeker

Oxyurichthys microlepis (Bleeker)

1849. *Gobius microlepis* Bleeker, *Verh. Genoot. Kunst. Wet.*, **22** : 35 (type-locality : Madura straits).
 1888. *Gobius microlepis* : Day, *Fishes of India*; 291, pl. 62, fig. 8.
 1991. *Oxyurichthys microlepis* : Talwar and Jhingran, *Inland Fishes*, **2** : 941-942.

Common Names : Maned goby (Eng.).

Material : 9.3.92, Hukitola, 8 exs., F. 665, T.V., 58.0-69.0 mm.

Diagnosis : No tentacle on eye, No bump over eye. No dark vertical band below eye. Longitudinal scales 55. Head scales alone behind eye.

Distribution : Indo-west Pacific.

Remarks : It attains 14 cm.

Oxyurichthys tentacularis (Valenciennes)

1837. *Gobius tentacularis* Valenciennes, *Hist. nat. Poiss*, **12** : 128 (type-locality : Java).
 1876. *Gobius tentacularis* : Day, *Fishes of India* : 291, pl. 64, fig. 4.
 1991. *Oxyurichthys tentacularis* : Talwar and Jhingran, *Inland Fishes*, **2** : 942.

Material : 22.2.89, Devi river near Ashtaranga, 1 ex., 92.0 mm, F. 328, T.V.

Diagnosis : Body elongate and compressed. Distinct elongate tentacle over eye. Longitudinal scales 52 to 65. Head scaled above and behind eyes.

Distribution : Indo-west Pacific.

Remarks : This is common in Chilka Lake.

Sub Family APOCRYPTEINAE

Genus *Apocryptes* Valenciennes*Apocryptes bato* (Hamilton)

1822. *Gobius bato* Hamilton, *Fishes of Ganges* : 40, 365, pl. 37, fig. 10 (type-locality : estuaries of Ganges).
 1876. *Apocryptes bato* : Day, *Fishes of India*, 302, pl. 64, fig. 6.
 1991. *Apocryptes bato* : Talwar and Jhingran, *Inland Fishes*, 2 : 951-952.

Material : 16.2.89, River luna at Badapal Dia near Paradeep, 12 exs., 77.0-142.0 mm, F. 401, T.V.

Diagnosis : First dorsal fin with 5 spines; anterior teeth of upper jaw bilobate, not caninoid; lateral line scales about 100. Body elongate. A dark brown band at base of pectoral fin.

Distribution : India, Bangladesh, Burma.

Remarks : It attains 20 cm. It forms a minor fishery in West Bengal and Bangladesh.

Genus *Parapocryptes* Bleeker*Parapocryptes macrolepis* (Bleeker)

1851. *Apocryptes macrolepis* Bleeker, *Nat. Tijds, Ned, Ind.* 2 : 66.
 1941. *Parapocryptes macrolepis* : Koumans, *Mem. Indian Mus.* 13 (3): 275-276.

Material : 16.10.90, Mouth of Mahanadi at Paradeep, 1 ex., 90.0 mm, F. 640, CANR.; 24.3.91, Mahanadi mouth at light house side, Paradeep, 3 exs., 135.0-155.0 mm, F. 681, T.V.

Diagnosis : Depth of body 10 to 12.5 times in standard length. Body elongate. Dorsal fins united; second dorsal fin with 28 soft rays; maxillary extends to hind edge of eye; back and side with reddish blotches, dorsal with 4-6 along black blotches.

Distribution : Sri Lanka, Andamans, Malay Archipelago.

Remarks : Grows to 23 cm.

Genus *Pseudapocryptes* Bleeker*Pseudapocryptes lanceolatus* (Bloch & Schneider)

1801. *Eleotris lanceolatus* Bloch and Schneider, *Syst. Ichthyol.* : 67, pl. 15 (type-locality; Tranquebar, Tamilnadu).
 1876. *Apocryptes lanceolatus* : Day, *Fishes of India* : 301.
 1876. *Apocryptes dentatus* : Day, *Fishes of India* : 301.
 1991. *Pseudapocryptes lanceolatus* : Talwar and Jhingran, *Inland Fishes*, 2 : 958-958, fig. 277.

Material : 26.7.90, Battighara, Paradeep, 1 ex., 130 mm, F.638, CANR.; 16.10.90, Mouth of Mahanadi at Paradeep, 1 ex., F.638, CANR.; 24.3.91, Mahanadi estuary at light house side, Paradeep, 4 exs., 114.0-125.0 mm, F. 682, T.V.; 11.3.92, Battighara light house, 1 ex., 125 mm, T.V.

Dignosis : Body elongate. Free ventral eye lid absent; eyes not elevated; first dorsal fin longer than high; scales minute more than 200 in longtidudinal series; teeth on upper jaw pointed; first dorsal fin with 5 spines; brown markings on back and cheak; caudal barred.

Distribution : India, Malaya, through the East Indies, to China and Japan.

Remarks : It attains 20 cm.

Genus *Boleophthalmus* Valenciennes

Boleophthalmus boddaerti (Pallas)

1770. *Gobius boddaerti* Pallas, *Spicilegia (Zool)*, 8:11, pl.1., fig. 4,5 (type-locality : Indian Ocean).

1876. *Gobius boddaerti* : Day, *Fishes of India* : 307, pl. 65, fig. 2.

1991. *Boleophthalmus boddaerti* : Talwar and Jhingran, *Inland Fishes*, 2 : 954, fig. 276.

Common Names : Mud skipper (Eng.); Moppa (Telugu).

Material : 21.3.91, Mangrove forest near Paradeep, 1 ex., 77.0 mm, F. 657, T.V.; 24.3.91, Mahanadi estuary, Light house side, Paradeep, 1 ex., 115.0 mm, F. 680, T.V.; 9.3.92, Hukitola (Paradeep), 1 ex., 44.0 mm, F. 666, T.V.

Diagnosis : Free lower eye lid present; eyes erectile above dorsal profile of head; first dorsal fin higher than long. Mandiblar teeth obliquely notched; scales small 60 to 125. No barbels on head. Dorsal fin with blue spots. Sides of body with 6 to 8 oblique bands or dark spots.

Distribution : India, Burma, Thailand, Malaya and the East Indies.

Remarks : It attains 20 cm.

Boleophthalmus sculptus Gunther

1861. *Boleophthalmus sculptus* Gunther, *Cat. Fish. Brit. Mus.*, 3 : 104.

1876. *Boleophthalmus sculptus* : Day, *Fishes of India*, 308.

1991. *Boleophthalmus sculptus* : Talwar and Jhingran, *Inland Fishes* 2: 953.

Common Names : Mud skipper (Eng.); Moppa (Telugu).

Material : 16.10.90, Mahanadi mouth at Paradeep, 1 ex., 73.0 mm, F.641, CANR; 11.3.92, Mahanadi mouth at Battighara (Paradeep), 1 ex., 61.0 mm, F.751, T.V.

Diagnosis : Dorsal fin devoid of blue spots; oblique bands on sides of body. Scales

on head and anterior portion of body in the form a flat, rounded tubercles. Third dorsal spine with a filamentous prolongation.

Distribution : India.

Remarks : Grows upto 80 mm.

Genus *Scartelaos* Swainson

Scartelaos viridis (Hamilton)

1822. *Gobius viridis* Hamilton, *Fishes of Ganges* : 42, 366, pl. 32, fig. 12 (type-locality : estuaries of Ganges).
 1876. *Boleophthalmus viridis* : Day, *Fishes of India* : 307, pl. 55, fig. 5.
 1991. *Scartelaos histophorus* : Talwar and Jhingran, *Inland Fishes*, 2 : 960-961, fig. 278.

Common Names : Moppa (Telugu).

Material : 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 1 ex., 77.0 mm, F. 605, T.V.; 5.3.92, Mouth of Mahanadi light house side, Paradeep, 5 exs., 49.0-81.0 mm, F. 667, T.V.

Diagnosis : Free lower eye lid; eyes erectile; mandibular teeth pointed; lower side of head with barbels; scales minute to rudimentary; last rays of dorsal fin connected by membrane to caudal fin; spots and cross bars on body.

Distribution : India, Bangladesh, Burma, through the East Indies, to the Philippines, China and Australia.

Remarks : It grows to 15 cm.

Sub Family PERIOPHTHALMINAE

Genus *Periophthalmodon* Bleeker

Periophthalmodon schlosseri (Pallas)

1770. *Gobius schlosseri* Pallas, *Spicilegia (Zool.)*, 8 : 3, pl. 1. figs. 1-4 (type-locality : Ambionia).
 1991. *periophthalmodon schlosseri* : Talwar and Jhingran, *Inland Fishes*, 2 : 962.

Common Names : Mud skipper (Eng.).

Material : 19.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 25.0-40.0 mm, F.419, T.V.

Diagnosis : Teeth on upper jaw in 2 rows, anterior ones caninoid; pelvic fins totally united; basal membrane of pelvic fins well developed. Longitudinal scales 51 to 61. Blue or shiny spots on head and body, a band from hind margin of eye to base of pectoral fin; a dark longitudinal band in middle of second dorsal.

Distribution : India, through the East Indies, to the Philippines, Australia and Fiji.

Remarks : It attains 9 cm.

Genus *Periophthalmus* Bloch & Schneider

Periophthalmus koelreuteri (Pallas)

1770. *Gobius koelreuteri* Pallas, *Spicilegia (Zool.)*, 8 : 8, pl. 2, figs. 1-3 (type-locality : not given).
 1876. *Periophthalmus koelreuteri* : Day, *Fishes of India*, 303, pl. 64, fig. 8.
 1991. *Periophthalmus koelreuteri* : Talwar and Jhingran, *Inland Fishes*, 3 : 965.

Common Names : Mud skipper (Eng.).

Material : 9.3.92, Kukitola, 3 exs., 40.0-45.0 mm, F. 663, T.V.

Diagnosis : Teeth on upper jaw is single now. Dorsal fins separate. Inner rays of pelvic fins united at base by a narrow membrane which is deeply emarginate; basal membrane of ventral fins moderate to weak; scales 70-90 in lateral line. First dorsal with a dark bend and second dorsal with white margin.

Distribution : Indo-west Pacific.

Remarks : Attains 17 cm.

FAMILY ELEOTRIDAE

Genus *Eleotris* Schneider

Eleotris fusca (Schneider)

1801. *Poecilia fusca* Schneider, *Syst. Ichth* : 453 (type-locality : Pacific Islands).
 1876. *Electris fusca* : Day, *Fishes of India*, 313, pl. 65, fig. 7.
 1991. *Eleotris fusca* : Talwar and Jhingran, *Inland Fishes*, 2 : 975-974, fig. 281.

Common Names : Dusky sleeper (Eng.).

Material : 24.3.91, Mahanadi estuary light house side, Paradeep, 3 exs., 52.0-65.0 mm, F. 687, T.V.

Diagnosis : Head depressed; pre-opercle with a single ventrally-directed spine; scales in longitudinal series 60 to 68; anterior most and third papillae row under eye extend below longitudinal row.

Distribution : Indo-west Pacific.

Remarks : Attains 17 cm.

Genus *Prionobutis* Bleeker*Prionobutis koilomatodon* (Bleeker)

1849. *Eleotris koilomatodon* Bleeker, *Verh. Bat. Gen.* 22 : 21.
 1941. *Prionobutis koilomatodon*, Koumans, *Mem. Indian Mus.*, 13 (3) : 319.

Material : 26.7.90, Bathighara, Paradeep, 1 ex., 60.0 mm.; 24.3.91, Mahanadi estuary at light house side, Paradeep, 6 exs., 61-79 mm, F. 683, T.V.; 11.3.92, Mahanadi estuary at light house side, Paradeep, 1 ex., 72 mm, F. 753, T.V.

Diagnosis : Bony ridge above eye; pre-opercle angle without spines; jaws and snout short; snout rounded, subequal to eye; lower jaw not projecting; head more or less rounded; no papillae and barbels on head; sensory canal pores on cheek; 3 dark bands on body; a dark spot on pectoral base.

Distribution : Indo-west Pacific.

FAMILY GOBIOIDIDAE

Genus *Brachyamblyopus* Bleeker*Brachyamblyopus brachysoma* (Bleeker)

1853. *Amblyopus brachysoma* Bleeker, *Nat. Tijds. Ned Ind.*, 5 : 510.
 1991. *Brachyamblyopus brachysoma* : Talwar and Jhingran, *Inland Fishes*, 2 : 982.

Common Names : Eel goby (Eng.).

Material : 24.3.91, Mahanadi estuary near light house side, Paradeep, 3 exs., 65.0-77.0 mm, F. 686, T.V.

Diagnosis : Body alongate and compressed. Scales present. Mouth oblique; dorsal and anal confluent with caudal. Chin with pores. Pectoral fin rays about 20.

Distribution : Indo-Australia Archipelago.

Remarks : Grows upto 105 mm.

Brachyamblyopus multiradiatus (Hardenberg)

1931. *Pseudotrypacuchen multiradiatus* Hardenberg, *Treubia*, 13, 3-4, pl. 418, fig. 8.
 1941. *Brachyamblyopus multiradiatus*, Koumans, *Mem. Indian Mus.*, 13 : 299.

Material : 21.3.91, Mangrove forest near Paradeep, 1 ex., 80.0 mm, F. 658, T.V.

Diagnosis : Body eel like. Pectoral fin rays about 40. Chin devoid of pores; scales in lateral line about 50.

Distribution : India.

Remarks : Grows upto 87 mm.

Genus *Odontamblyopus* Bleeker

Odontamblyopus rubicundus (Hamilton)

1822. *Gobioides rubilcundus* Hamilton, *Fishes of Ganges* : 37, 365, pl. 5., fig. 9. (type-locality : estuaries of Ganges).
 1976. *Gobioides rubicundus* : Day, *Fishes of India* : 319, pl. 67, fig. 6.
 1991. *Odontamblyopus rubicundus* : Talwar and Jhingran, *Inland Fishes, 2* : 983-984.

Common Names : Rubicundus eel goby (Eng.).

Material : 16.10.90, Mouth of Mahanadi at Paradeep, 1 ex., 83.0 mm, F. 642, CANR.; 24.3.91, Mouth of Mahanadi light house side, Paradeep, 2 exs., 120.0-170 mm, F.658 A, T.V.

Diagnosis : Barbels on chin and lower jaw, body eel like and compressed. Eyes very small; pectoral fin long, about 70% of head length; mouth oblique, with symphysial canines on lower jaw; scales minute.

Distribution : India, Burma, through the East Indies, to China and Japan.

Remarks : It attains 25 cm.

Genus *Taenioides* Lacepede

Taenioides buchanani (Day)

1873. *Amblyopus buchanani* Day, *Proc. Zool. Soc. Lond.*, : 110 (type-locality : Calcutta and Moulmein).
 1876. *Gobioides buchanani* : Day, *Fishes of India* : 318, pl. 67, fig. 5.
 1991. *Taenioides buchanani* : Talwar and Jhingran, *Inland Fishes, 2* : 985.

Common Names : Burmese goby eel (Eng.).

Material : 21.2.89, Mouth of river Devi near Ashtaranga, 1 ex., 220 mm, F. 546, T.V.; 22.3.91, Mangrove forest, Paradeep, 1 ex., 233.0 mm.

Diagnosis : Dorsal and anal fins more or less completely confluent with caudal fin; caudal fin pointed; vertical fins black; pre anal distance more than 40% of standard length; 5 canines on each side of jaw.

Distribution : East coast of India and Burma.

Remarks : It grows to 30 cm.

Taenioidus cirratus (Blyth)

1861. *Amblyopus cirratus* Blyth, *J. Asiat. Soc. Beng.*, **29** : 147 (type-locality : Hooghly river at Calcutta).
 1876. *Gobioides cirratus* : Day, *Fishes of India* : 318, pl. 69, fig. 4.
 1991. *Taenioides cirratus* : Talwar and Jhingran, *Inland Fishes*, **2** : 985-986.

Common Names : Hoogly goby eel.(Eng.).

Material : 16.10.90, Mouth of Mahanadi at Paradeep, 1 ex., 166.0 mm, F. 639, CANR.; 24.3.91, Mouth of Mahanadi near light house side, Paradeep, 3 exs., 170.0-180.0 mm, F. 688, T.V.; 11.3.92, Mangrove forest, Paradeep, 1 ex., 230.0 mm, T.V.

Diagnosis : Dorsal and anal fins completely separated from caudal fin by a deep notch. Caudal fin rhomboid; 5 canines on each side of upper jaw and 4 canines on each side of lower jaw; scales absent; small brown spots on flanks.

Distribution : Indo-west Pacific.

Remarks : It attains 25 cm.

Family TRYPAUCHENIDAE

Genus *Trypauchen* Valenciennis*Trypauchen vagina* (Bloch & Schneider)

1801. *Gobius vagina* Bloch and Schneider, *Syst. Ichth* : 73 (type-locality : Tranquebar, India).
 1876. *Trypauchen vagina* : Day, *Fishes of India* : 320, pl. 68, fig. 2.2
 1991. *Trypauchen vagina* : Talwar and Jhingran, *Inland Fishes*, **2** : 988.

Common Names : Burrowing goby (Eng.).

Material : 26.7.90, Bathighara, Paradeep, 3 exs., 80.0-117.0 mm.; 16.10.90, Mouth of Mahanadi at Paradeep, 1 ex., 83.0 mm, F. 643, CANR.; 11.3.92, Bathighara light house, Paradeep, 3 exs., F. 750, T.V.

Diagnosis : Pelvic fins completely united, forming a funnel like disc; eyes minute, mouth oblique; teeth in several rows pointed, outer row enlarged and caninoid; dorsal fin continuous; dorsal and anal fins confluent with caudal fin; scales small 80 to 100 in longitudinal series; head naked; colour pinky white.

Distribution : Indo-west Pacific.

Remarks : It attains 22 cm.

Sub Order ACANTHUROIDEI

Family ACANTHURIDAE

Genus *Acanthurus* Forskal*Acanthurus pyroferus* Kittlitz

Material : 21.2.89, Devi river mouth, Ashtaranga, 1 ex., 42 mm.

Sub Order SCOMBERODEI

Family TRICHIURIDAE

Genus *Eupleurogrammus* Gill*Eupleurogrammus glossodon* (Bleeker)

1860. *Trichiurus glossodon* Bleeker, *Acta. Soc. Sci. Indo-Neerl., S, Dertelende Bjjdr. Vishef. Bornea* : 36 (type-locality : Java, Sumatra, Singapore, Bintang, Bornea).
 1991. *Euplerogrammus glossodon* : Talwar and Jhingran, *Inland Fishes, 2* : 783-784, fig. 317.

Common Names : Bleeker's ribbon fish (Eng.).

Material : 23.11.90, Devi river near Ashtaranga, 2 exs., 270-300 mm, F. 701, DSM.

Diagnosis : Caudal fin absent, body tapering to a point. Pelvic fins present appearing as scale-like structures, lateral line gently sloping from upper angle of operculum to tip of tail; lower hind border of operculum convex. Dorsal fin with 123 to 131 soft rays; anal fin origin below 31st to 37th soft dorsal rays. Pelvic fins present but reduced to wing-like structures. Body silvery white.

Distribution : India and the East Indies.

Remarks : Attain 50 cm.

Genus *Lepturacanthus* Fowler*Lepturacanthus pantului* (Gupta)

1966. *Trichiurus pantului* Gupta, *Proc. Zool. Soc. Calcutta, 19* : 170 (type-locality : Hooghly estuary).

Common Names : Coromandal ribbon fish (Eng.).

Material : 23.11.90, Devi river Near Ashtaranga, 1 exs., 300 mm, F. 707, T.V.

Diagnosis : Pelvic fins absent. First anal spine large, half of eye diameters; soft anal

rays pungent spinules, breaking ventral spine; two small, forward directed canine teeth in upper jaw, a small slit present on ventral side of lower jaw for receiving anterior most fang of upper jaw. Snout short, its length about 3 times in head length. A very small spot present on anterior base of pectoral fin.

Distribution : East coast of India.

Remarks : It attains 70 cm.

Sub Order ANABANTOIDEI

Family ANABANTIDAE

Genus *Anabas* Cuvier

Anabas testudineus (Bloch)

1795. *Anthias testudineus* Bloch, *Naturges. ausland Fische*, (6) : 121, pl. 322 (type-locality : Java).
 1876. *Anabas scandens* : Day, *Fishes of India* : 370, pl. 78, fig. 3.
 1991. *Anabas testudineus* : Talwar and Jhingran, *Inland Fishes*, 2 : 996-998.

Common Names : Clibing perch (Eng.); Col. Kow (Oriya).

Material : 23.11.90, Devi river near Ashtaranga, 1 ex., 80-97 mm, F. 699, DSM.

Diagnosis : Preopercle with fixed conical teeth; two lateral lines present; upper jaw only weakly protrusible. Depth of body 3 to 3.5 times in standard length; snout length 13 to 17.5 times in standard length.

Distribution : Pakistan, India, Bangladesh, Sri Lanka, Burma, Malay Archipelago, Singapore and the Philippines.

Remarks : It is an air breathing fish. It is suitable for cultivation in ponds, reservoirs and rice fields. It attains a length of 25 cm.

Family SCOMBRIDAE

Genus *Rastrelliger* Jordan and Starks

Rastrelliger kanagurta (Cuiver)

1817. *Scomber kanagurta* Cuiver, *Regne. Animal.* 2 : 313 (type-locality : Vizagapatnam).
 1876. *Scomber microlepidotus* : Day, *Fishes of India* : 250, pl. 54, fig. s.3,4, & 5.
 1984. *Rastrelliger kanagurta* : Talwar and Kacker, *Comm. Sea Fish, India* : 807-809, fig. 329.

Common Names : Indian mackerel (Eng.); Karan-kite (Oriya); Managurta, Kannangadatha (Telugu).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 113-117 mm, F. 317, T.V.

Diagnosis : Gill rakers 30 to 48 on lower arm of first arch, clearly visible when mouth is opened, the mouth looking as if full of feathers; body depth 4.0 to 4.8 times in standard length; head length about equal to or more than greatest body depth; dark longitudinal stripes often clear on upper half of body, back blue green.

Distribution : Indo-west Pacific.

Remarks : Commonly known as mackerel, its fishery is fully exploited.

Genus *Scomberomorus* Lacepede

Scomberomorus guttatus (Bloch & Schneider)

1801. *Scomber guttatus* Bloch and Schneider, *Syst. Ichth.* 23, pl. 5 (type-locality : Tranquebar).
 1876. *Cybium guttatum* : Day, *Fishes of India* : 255, pl. 55, fig. 1 & pl. 56, fig. 4.
 1984. *Scomberomorus guttatus* : Talwar and Kacker, *Comm. Sea Fish India* : 813-814, fig. 322.

Common Names : Indo-Pacific Spanish Mackerel (Eng.); Vanjiramu, Wingram (Telugu).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 ex., 80 mm, F. 526, T.V.; 22.3.91, Mangrove forest, Paradeep, 1 ex., 64.0 mm, T.V.

Diagnosis : Lower arm of pre-operculum prominently projecting backwards as a much longer process than the upper arm. Lateral line without a prominent dip under the second dorsal fin, with auxillary branches off the anterior part of the lateral line; 3 irregular rows of dark round spots along the sides of body; spinous dorsal fin black upto the eighth dorsal spine and the rest white and tipped with black.

Distribution : Indo-west Pacific.

Remarks : Reaches 76 cm.

Family ARIOMMIDAE

Genus *Ariomma* Jordan & Snyder

Ariomma indica (Day)

1870. *Cubicepa indicus* Day, *Proc. Zool. Soc. India* : 690 (type-locality : Madras).
 1876. *psenes indicus* : Day, *Fishes of India* : 237, pl. 54, fig. 2.
 1984. *Ariomma indica* : Talwar and Kacker, *Comm. Sea Fish India* : 835-836, fig. 343.

Common Names : Indian ariomma (Eng.).

Material : 16.3.91, Mahanadi mouth near light house, Paradeep, 2 exs., F. 625, T.V.; 21.3.91, Mangrove forest, Paradeep, 2 exs., 72.0 and 76.0 mm, T.V.

Diagnosis : Two dorsal fins scarcely separated, the first fin with 10 to 12 long and slender spines and second fin with 1 spine and 13 to 16 soft rays. Anal fin with 3 spines and 14 to 16 soft rays. A median groove along belly for reception of folded pelvic fins.

Distribution : Indo-west Pacific.

Remarks : The flesh, rich in fat, is esteemed.

Family STOMATEIDAE

Genus *Pampus* Bonaparti

Pampus chinensis (Euphrasen)

1788. *Stromateus chinensis* Euphrasen, *Kongl. Vetensk Acad. Handl. Stockholm*, 9 : 53, fig. 9 (type-locality : "Castellum chinese Bocca Tigris dictum").
 1876. *Stromateus chinensis* : Day, *Fishes of India*, 246, pl. 51 C, fig. 6.
 1984. *Pampus chinensis* : Talwar and Jhingran, *Comm. Sea Fish. India* : 830-840, fig. 345.

Common Names : Chinese pomfret (Eng.); Dhala Chandi (Oriya); Chanduva (Telugu).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 ex., F. 524, T.V.; 22.3.91, Mangrove forest near Paradeep, 1 ex., 47.0 mm, T.V.

Diagnosis : Body deep and compressed. Dorsal and anal fins not falcate but finrays gradually diminish posteriorly; no spines preceding the median fins; caudal fin emarginate.

Distribution : Pakistan, India and China.

Remarks : It is a good table fish. Growth upto 31 cm. It occurs in shoals.

Sub Order CHANNOIDEI

Family CHANNIDAE

Genus *Channa* Scopoli

Channa punctata (Bloch)

1793. *Ophiocephalus punctatus* Bloch, *Naturges. ausland. Fische*, (7) : 139, pl. 358 (type-locality : rivers and lakes of Coromandal coast).
 1876. *Ophiocephalus punctatus* : Day, *Fishes of India* : 367, pl. 78, fig. 1.
 1919. *Channa punctatus* : Talwar and Jhingran, *Inland Fishes*, 2 : 1020-21

Common Names : Spotted snake-head (Eng.); Gorissa (Oriya); Matta gudisa, Burada matta (Telugu).

Material : 5.12.89, mahanadi mouth at Paradeep, 1 ex., 190 mm, DSM.

Diagnosis : Pre dorsal scales 12 or 13; 4 to 5 scale rows between pre-opercular angle and posterior border of orbit. Pectoral fins plain, no vertical bands; dorsal fin rays 28 to 32; length of pelvic fin more than 50% of pectoral fin length. Several dark blotches on side.

Distribution : India, Pakistan, Afghanistan, Sri Lanka, Nepal, Bangladesh, Burma and Yunan.

Remarks : It attains 31 cm. Prefers stagnant waters.

Order PLEURONECTIFORMES

Suborder PLEURONECTOIDEI

Family BOTHIDAE

Genus *Pseudorhombus* Bleeker

Pseudorhombus arsius (Hamilton)

1822. *Pleuronectes arsius* Hamilton, *Fishes of Ganges* : 128 (type-locality : Ganges estuary below Calcutta).
 1877. *Pseudorhombus arsius* : Day, *Fishes of India* : 423, pl. 91, fig. 5.
 1991. *Pseudorhombus arsius* : Talwar and Jhingran, *Inland Fishes, 2* : 1039-1040, fig. 297.

Common Names : Largetooth flounder (Eng.); Noree nalaka (Telugu).

Material : 12.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 55.0 mm, F. 312, T.V.; 13.2.89, Devi river mouth near Sonadhara, 1 ex., 140.0 mm, F. 372, T.V.; 13.2.89, Saharledi river near Poddampur, 1 ex., 36.0 mm, F. 444, T.V.; 14.2.89, Mouth of Mahanadi at Paradeep, 3 exs., 42-52 mm, F. 589, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 68.0 mm, F. 373, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 4 exs., 57-81 mm, F. 549, T.V.; 18.2.89, Mouth of Mahanadi at Paradeep, 3 exs., F. 581, T.V.; 19.2.89, Mouth of Mahanadi at light house side, Paradeep, 4 exs., F. 391, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 7 exs., 41-87 mm, F. 418, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 73 mm, F. 465, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 1 ex., F. 514, T.V.; 21.2.89, Devi river mouth near Ashtaranga, 1 ex., 80 mm, F. 535, T.V.; 17.3.91, Mangrove forest at Paradeep, 1 ex., 83.0 mm, F. 493, T.V.; 11.3.92, Mangrove forest, at Paradeep, 3 exs., 102.0-125.0 mm, F. 743, T.V.; 22.3.91, Mangrove forest Paradeep, 1 ex., 63.0 mm.; 21.3.91, Mangrove forest, paradeep, 1 ex., 80.0 mm.

Diagnosis : Scales cycloid on blind side of body; and ctenoid on eye side; teeth on lower jaw large and widely spaced and enlarged anteriorly, 6 to 13 on blind side of jaw; lateral line curved above pectoral fin; a large dark spot at junction of straight and curved parts of lateral line; two smaller spots, on later line and caudal peduncle.

Distribution : Indo-west Pacific.

Remarks : It grows upto 30 cm. Numerous rounded spots are seen.

Pseudorhombus dupliciocellatus Regan

1905. *Pseudorhombus dupliciocellatus* Regan, *Ann. Mag. nat. Hist.*, (7) 15:25 (type-locality : Inland Sea of Japan).
 1984. *Pseudorhombus dupliciocellatus* : Talwar and Kacker, *Comm. Sea Fish. India* : 852-853, fig. 350.

Common Names : Ocellated flounder (Eng.).

Material : 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 80.0 mm, F. 354, T.V.

Diagnosis : Gill rakers palmate, as broad as long. Body oval, flat with a strong notch in upper profile of head; lateral line curved above pectoral fin, forming two branches on head; ocular side brownish with 3 large paired spots, each pair surrounded by a ring of white spots.

Distribution : Indo-Australian Archipelago.

Remarks : The only sp. of *Pseudorhombus* with palmate gill rakers. Dorsal and anal with 7 and 6 small prominent spots between smaller spots.

Sub Order SOCEIODEI

Family CYNOGLOSSIDAE

Genus *Cynoglossus* Hamilton

Cynoglossus bilineatus (Lacepede)

1802. *Achirus bilineatus* Lacepede, *Hist. nat. Poiss.*, 4 : 659, 663 (type-locality : China; East Indies).
 1877. *Cynoglossus quadrilineatus* : Day, *Fishes of India* : 435.
 1877. *Cynoglossus quinquelineatus* : Day, *Fishes of India* : 432, pl. 98, fig. 1.
 1877. *Cynoglossus sindensis* : Day, *Fishes of India* : 434, pl. 90, fig. 6.6.
 1984. *Cynoglossus bilineatus* : Talwar and Kacker, *Comm. Sea Fish. India* : 874-875, fig. 360.

Common Names : Fourlined tongue sole (Eng.).

Material : 15.2.89, Mouth of Mahanadi at Paradeep, 4 exs., 175-225 mm, F. 302, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 200-250 mm, F. 341, T.V.

Diagnosis : Mouth interior. Lips smooth, not fringed. Caudal fin with 12 rays. Two lateral lines on blind side. ocular side brown, with irregular dark blotch on operculum. blind side white.

Distribution : From Malay Archipelago to the coasts of India and Pakistan and to New Guinea and Australia, Taiwan and Japan.

***Cynoglossus itinus* (Snyder)**

Material : 20.2.89, Mahanadi mouth at Paradeep, 1 ex., 180.0 mm, F. 455, T.V.

***Cynoglossus linguus* Hamilton**

1822. *Cynoglossus lingua* Hamilton, *Fishes of Ganges* : 32, 365 (type-locality : Gangetic estuaries).
 1877. *Cynoglossus lingua* : Day, *Fishes of India* : 433, pl. 96, fig. 1.
 1991. *Cynoglossus lingua* : Talwar and Jhingran, *Inland Fishes, 2* : 1042.

Common Names : Long tongue-sole (Eng.).

Material : 17.2.89, Mahanadi mouth at Paradeep, 1 ex., 230.0 mm, F. 342, T.V.; 21.2.89, Devi river near Ashtaranga, 2 exs., 241.0-250 mm, F. 545, T.V.; 22.2.89, Devi river near Ashtaranga, 1 ex., 138.0 mm, F. 334, T.V.; 20.2.90, Devi river near Ashtaranga, 1 ex., 225 mm, F. 714, CANR.; 23.11.90, Devi river near Ashtaranga, 1 exs., 178 mm, F. 706, DSM.

Diagnosis : Cycloid scales on blind side of body. Body tongue shaped. Two lateral lines on ocular side of body. Scales 11 or 12 between lateral lines on ocular side of body. A large black blotch on operculum.

Distribution : East coast of India, through the East Indies, to the Philippines.

Remarks : Attains 15 cm.

***Cynoglossus puncticeps* (Richardson)**

1846. *Plagusia puncticeps* Richardson, *Rep. Br. Ass. Advmt. Sci.*, 15 : 280 (type-locality ; China).
 1877. *cynoglossus brevis* : Day, *Fishes of India* : 437, pl. 97, fig. 2.
 1877. *Cynoglossus brachyrhynchus* : Day, *Fishes of India* : 435, pl. 96, fig. 4.
 1991. *Cynoglossus puncticeps* : Talwar and Jhingran, *Inland Fishes, 2* : 1043-44, fig. 298.

Common Names : Speckled tongue sole (Eng.).

Material : 19.2.89, Mahanadi mouth at Paradeep, 1 ex., 100.0 mm, F. 412, T.V.; 23.11.90, Devi river near Ashtaranga, 1 ex., 110 mm, F. 705, DSM.; 24.3.91, Mahanadi estuary at light house side, Paradeep, 1 ex., 127.0 mm, F. 693, T.V.

Diagnosis : Scales ctenoid on blind side of body. Eyes with distinct interspace. Body with large irregular blotches on head and body; 16 to 19 scale-rows between lateral lines. No lateral line on blind side.

Distribution : India, Pakistan, Burma through the East Indies, to the Philippines and Australia.

Remarks : It attains 16 cm.

Genus *Paraplagusia* Bleeker*Paraplagusia bilineata* (Bloch)

1784. *Pleuronectes bilineata* Bloch, *Naturges, ausland. Fische.* (3):29, pl. 188 (type-locality : China).
 1877. *Plagusia marmorata* : Day, *Fishes of India* : 431, pl. 95, fig. 1.
 1991. *Paraplagusia bilineata* : Talwar and Jhingran, *Inland fishes, 2* : 1044-1045, fig. 299.

Common Names : Fringe-lipped tongue sole, Double-lined tongue sole (Eng.); Nahiah, Arabu (Telugu).

Material : 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 233.0 mm, F. 301, T.V.; 19.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 150-162 mm, F. 405, T.V.; 16.3.91, Mouth of Mahanadi at light house side, Paradeep, 2 exs., 155.0-170.0 mm, F. 600. T.V.

Diagnosis : Lips on ocular side of head distinctly fringed. Two lateral lines seperated by 16 to 19 rows of scales. Body tongue shaped. No lateral line on blind side. snout strongly hooked over-hanging mouth opening.

Distribution : Indo-west Pacific.

Remarks : Attains 25 cm.

Paraplagusia blochii (Bleeker)

Material : 11.3.92, Mangrove forest, Paradeep, 1 ex., 215.0 mm, T.V.

Family SOLEIDAE

Genus *Euryglossa* Kaup*Euryglossa orientalis* (Bloch)

1801. *Pleuronectes orientalis* Bloch, *Syst. Ichthyol* : 157 (type-locality : Tranquebar).
 1877. *Synoptura orientalis* : Day, *Fishes of India* : 429, pl. 93, fig. 4 and pl. 94, fig. 2.
 1984. *Euryglossa orientalis* : Talwar and Kacker, *Comm. Sea Fish. India* : 861-862, fig. 355.

Common Names : Oriental-sole (Eng.).

Material : 23.11.90, Devi river near Ashtaranga, 1 ex., 147 mm, F. 704, DSM.; 21.2.90, Devi river mouth, Mahanadi Ashtaranga, 1 ex., 140.0 mm.

Diagnosis : Pectoral fins of both sides well developed. Scales on head and nape of same size as others; caudal fin with 18 to 20 rays. Body with cloudy indistinct patches on eyed side, tinged yellow on blind side.

Distribution : From Persian Gulf, through India, the East Indies to China and Australia.

Remarks : Grows upto 220 mm.

Genus *Synaptura* Cantor

Synaptura albomaculata Kaup

1858. *Synaptura albomaculata* Kaup, Archiv, Naturgeseh., 24 (1) : 96 (type-locality : Coromandal coast).
 1877. *Synaptura albomaculata* : Day, *Fish of India* : 429, pl. 93, fig. 5.
 1984. *Synaptura albomaculata* : Talwar and Jhingran, *Inland Fishes*, 2 : 1048-1049.

Common Names : Kaup's sole (Eng.).

Material : 15.2.89, Mahanadi mouth at Paradeep, 1 ex., 82.0 mm, F. 293, F. 627, T.V.; 19.2.89, Mahanadi mouth at Paradeep, 1 ex., 168 mm, F. 410, T.V.

Diagnosis : Caudal fin confluent with dorsal and anal fins. Opercular membrane not joined to pectoral fins. Body elongate, a bony process on snout. 2 or 3 rows of white spots of ocular side of body; a tentacle between the nostrils.

Distribution : East coast of India, Bangladesh and Burma.

Remarks : Grows to 30 cm.

Genus *Solea* Quensel

Solea elongata Day

1877. *Solea elongata* Day, *Fishes of India*, 426, pl. 90, fig. 4 (type-locality : Madras).
 1984. *Solea elongata* : Talwar and Kacker, *Comm. Sea Fish. India* : 864.

Common Names : Elongate sole (Eng.).

Material : 13.2.89, Devi river mouth near Sonadhara, 1 ex., 46.0 mm, F. 366, T.V.

Diagnosis : Body elongata, its depth 2.5 to 3.0 times in total times in total length; dorsal fin with 72 to 77 rays; anal fin with 59 to 63 rays; spots and black blotches on ocular side of body.

Distribution : Persian Gulf, Pakistan, India and Sri Lanka.

Solea ovata Richardson

1846. *Solea ovata* Richardson, *Rep. Br. Assoc. Adv. Sci.* : 279 (type-locality : China).
 1877. *Solea ovata* : Day, *Fishes of India* : 426, pl. 93, fig. 1.
 1984. *Solea ovata* : Talwar and Jhingran, *Comm. Sea Fish. India* : 864-865, fig. 356.

Common Names : Ovata sole (Eng.).

Material : 21.2.89, Devi river mouth near Ashtaranga, 1 ex., F. 512, T.V.; 22.3.91, Mangrove Forest, Paradeep, 1 ex., 42.0 mm, T.V.

Diagnosis : Body ovate, its depth 2.0 to 2.2 times in total length; dorsal fin with 58 to 67 rays; anal fin with 41 to 51 rays; spots and black blotches on ocular side of body and fins.

Distribution : India, through the East Indies, to China.

Genus *Synaptura* Cantor

Synaptura commersoniana (Lacepede)

1802. *Pleuronectes commersonianus* Lacepede, *Hist. nat. Poiss.*, 3: pl. 12, fig. 2. (type-locality : Mauritius).
 1877. *Synaptura commersoniana* : Day, *Fishes of India* : 428, pl. 94, fig. 1.
 1984. *Synaptura commersoniana* : Talwar and Kacker, *Comm. Sea Fish. India.* 867, fig. 357.

Common Names : Commerson's sole (Eng.); Jerree-potoo (Telugu).

Material : 20.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 140.0 mm, F. 450, T.V.

Diagnosis : Scales on head and nape of ocular side are larger than those on body; with out white spots; no tentacle between the nostrils.

Distribution : Indo-west Pacific.

Remarks : Grows to 30 cm.

Order TETRAODONTIFORMES

Family TRIACANTHIDAE

Genus *Triacanthus* Cuvier

Triacanthus biaculeatus (Bloch)

1786. *Balistes biaculeatus* Bloch, *Naturges. Ausland. Fische*, (2) : 19 (type-locality : East Indies).
 1991. *Triacanthus biaculeatus*, Talwar and Jhingran, *Inland Fishes*, 2 : 1051.

Common Names : Short nosed tripod fish (Eng.).

Material : 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., F. 568, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 1 ex., F. 323, T.V.

Diagnosis : Body covered with small scales with a prominent spinule on top of a uniform ridge; caudal peduncle long tapering to base of caudal fin; first dorsal fin with one strong, rough spine and four smaller ones, second dorsal spine much less than half length of first spine; ventral fins each with a strong, rough spine; a silvery stripe on body.

Distribution : Indo-west Pacific.

Remarks : Common in Chilka Lake.

***Tricanthus brevirostris* Schlegel**

Material : 22.2.89, Devi river mouth near Ashtaranga, 1 ex., 129.0 mm, T.V.

Family TETRAODONTIDAE

Genus *Chelonodon* Muller

***Chelonodon fluviatilis* (Hamilton)**

1822: *Tetrodon fluviatilis* Hamilton, *Fishes of Ganges* : 6, 362, pl. 30, fig. 1. (type-locality : Ganges river).

1878. *Tetrodon fluviatilis* : Day, *Fishes of India* : 707, pl. 183, fig. 1.

1919. *Chelonodon fluviatilis* : Talwar and Jhingran, *Inland Fishes*, 2 : 1055-1056.

Common Names : Green puffer fish, Estuarine blow fish (Eng.).

Material : 13.2.89, Saharbedi river near Poddampur, 1 ex., 52.0 mm, F. 441, T.V.; 19.2.89, Mahanadi mouth at light house side, Paradeep, 1 ex., 35.0 mm, F. 390, T.V.

Diagnosis : Nasal organ cup-like, with two rounded lobes at its tip; inter-orbital space convex. Back of body with three dark blotches in longitudinal row.

Distribution : India, Sri Lanka, Bangladesh, Burma and Bornea.

Remarks : It attains a length of 17 cm. It is poisonous to human beings.

Genus *Lagocephalus* Swainson

***Lagocephalus lunaris* (Bloch & Schneider)**

1801. *Tetrodon lunaris* Bloch & Schneider, *Syst. Ichth* : 505 (type-locality : Malabar, India).

1878. *Tetrodon lunaris* : Day, (*Partim*) *Fishes of India* : 701, pl. 182, fig. 2.

1991. *Lagocephalus lunaris* : Talwar and Jhingran, *Inland Fishes*, 2 : 1058.

Common Names : Moontail blaas̄sop (Eng.).

Material : 15.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 90.0 mm, F. 632, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 2 exs., F. 561, T.V.; 5.12.89, Mouth of Mahanadi at Paradeep, 48 exs., 19-48 mm, F. 758, DSM.; 17.3.91, Mangrove forest near Paradeep, 2 exs., 54-135 mm, F. 495, T.V.

Diagnosis : Nasal organ covered by a small sac with two nostrils; interorbital space shorter than snout; caudal fin emarginate or truncate. Spinules on dorsal surface of body and head and those on dorsal surface extend to dorsal fin. Two lateral lines. A yellowish streak from eye to caudal fin.

Distribution : Indo-west Pacific.

Remarks : It attains 30 cm.

Genus *Takifugu* Abe

Takifugu oblongus (Bloch)

1786. *Tetrodon oblongus* Bloch, *Naturges. ausland. Fische*, (2):6, pl. 146, fig. 1. (type-locality : Swaste, East Indies).
 1878. *Tetrodon oblongus* : Day, *Fishes of India* : 702, pl. 182, fig. 3.
 1991. *Takifugu oblongus* : Talwar and Jhingran, *Inland Fishes*, 2 : 1059-1060.

Common Names : Lattice blaasop (Eng.).

Material : 13.2.89, Devi river mouth near Ashtaranga, 4 exs., 22-133 mm, F. 349, T.V.; 5 exs., 25-100 mm, F. 364, T.V.; 15.2.89, Mouth of Mahanadi at Paradeep, 2 exs., 47-79 mm, F. 295, T.V.; 140-150 mm, 1 ex., 48 mm, F. 637, T.V.; 17.2.89, Mouth of Mahanadi at Paradeep, 1 ex., 148 mm, F. 343, T.V.; 19.2.89, Mouth of Mahanadi at light house side, Paradeep, 1 ex., 140 mm, F. 392, T.V., F. 562, 1 ex., F. 416, T.V.; 20.2.89, Mouth of Mahanadi at Paradeep, 3 exs., 40-80 mm, F. 353, T.V., 1 ex., 70 mm, F. 466, T.V.; 21.2.89, Devi river mouth at Ashtaranga, 7 exs., 35-55 mm, F. 532, T.V.; 22.2.89, Devi river mouth near Ashtaranga, 2 exs., 38-62 mm, F. 327, T.V.; 17.3.91, Mangrove forest near Paradeep, 3 exs., 34-70, F. 497, T.V.

Diagnosis : Nasal organ covered by a small sac with 2 nostrils; inter-orbital space longer than snout; caudal peduncle depth sub-equal to its length; caudal fin truncate; spots and bars on body. Two lateral lines; top of head, front part of back, and belly, with spines.

Distribution : Indo-west Pacific.

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SNAKES

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INTRODUCTION

Various extensive surveys have been undertaken of Mahanadi Estuary from 1989 to 1992 under different capacities to explore the fauna of the estuary.

Mahanadi is one of the major estuaries in India and the longest river in Orissa with a length of about 853 kms. It lies in Cuttack and Puri districts of Orissa State and finally end up into the Bay of Bengal. The tidal extension near the mouth is upto about 32 kms. Two main branches join the Bay of Bengal. The main branch joins the Bay of Bengal at Paradeep and another major branch namely Devi river joins the sea near Astranga. In Paradeep on way to Hukitola thick dense mangrove vegetation has been observed.

The snakes were observed to be more prevalent during monsoon period. In our collections also more snakes have been collected during monsoon period comparatively than that of summer season. The salinity were lower that time ranging from 2 to 3 PPT.

SYSTEMATIC LIST

Class REPTILIA

Sub-class LEPIDOSURIA

Order SQUAMATA

Sub-order SERPENTES (OPHIDIA)

Family NATRICIDAE

Xenochrophis piscator (Schneider)

Common Name : Checkered Keelback

Family HOMALOPSIDAE

***Cerberus rhynchops* (Schneider)**

Common Names : Dog faced water snake

Family ELAPIDAE

***Enhydrina schistosa* (Daudin)**

Common Name : Hook nosed sea snake

Family HYDROPHIIDAE

***Hydrophis obscurus* Daudin**

Common Name : Estuarine sea snake

SYSTEMATIC ACCOUNT

Family NATRICIDAE

Diagnostic Characters : Keeled scales, round eye pupils and upper part of the body having a chessboard type arrangement of black and yellow spots.

Genus ***Xenochrophis*** Gunther 1864

Diagnostic characters : Maxillary teeth long, 20-25 sub equal teeth; head fairly distinct from neck with angular canthus rostralis; nostril in a single nasal directed upward and outwards; body cylindrical with moderate tail, paired sub caudals.

***Xenochrophis piscator* (Schneider)**1799. *Hydrus piscator* Schneider, *Hist. Amph.* i, p. 247.1940. *Natrix piscator piscator* Smith, *Rec. Ind. Mus.*, 42 : 483.1978. *Xenochrophis piscator*, Whitaker, common Indian snakes, p.22.

Material examined : 1 ex., Light House side, Paradeep, 1.8.1989, T. Venkateswarlu and party.

Description : Length 350 mm, girth of the thickest 310 mm, head pointed tail long, dorsal side with chess board like fashion of black and yellow spots on the yellowish ground surface, ventral side white, maxillary teeth 26; nostrils directed slightly upwards; scales in 19 rows, keeled except out two smooth rows; two oblique black streaks, one below, the other behind the dorsal spots arranged in five series.

Distribution : India, Pakistan, Bangladesh, Burma & China.

Remarks : This is a non-prisonous, aggressive water snake found throughout India and mimicking the cobra when excited.

Family HOMALOPSIDAE

Diagnostic characters : Dentition well developed the last two or three maxillary teeth grooved and enlarged; nostril crescentric on the upper surface of the snout; ventrals rather narrow; tail moderate or short.

Genus *Cerberus* Cuvier

Diagnostic characters : Maxillary teeth 12 to 17, Parietal Shields broken into small scales, scales in 21 to 29 rows.

Carberus rhynchops (Schneider)

1799. *Hydrus rhynchops* Schneider, *Hist. Amph.* i. 246.
1943. *Cerberus rhynchops*, Smith, *Fauna Brit. India, Rept. Amph.* iii, Serpentes, p. 393.
1978. *Cerberus rhynchops*, Whitaker, *Common Indian snakes*, p.44.

Material examined : 8 exs. Mouth of Mahanadi, Paradeep, 25.7.1989, T. Venkateswarlu & Party; 4 exs. near light house side of Mahanadi estuary Paradeep, 21.07.1990. T. Venkateswarlu & Party; light house side of Mahanadi estuary, Paradeep, 22.7.1990. T. Venkateswarlu & party; 1 ex. Mangrove forest, Paradeep, 11.3.1992, T. Venkateswarlu & Party.

Description : Length 605 to 675 mm, girth of the thickest 52 to 73 mm, head broader than neck with rounded snout; nostrils and eyes situated high on the head; frontal broken into small scales, scales strongly keeled, back grey with numerous black cross-bars, a black streak on the side of the head passed through the eyes and on to the neck.

Distribution : Coastal and tidal rivers of Indian and Indo-Chinese region; Ceylon, Malay Peninsula and Archipelago.

Remarks : This is a non-poisonous snake found in muddy and rocky areas in estuaries specially in mangrove swamps.

Family ELAPIDAE

Diagnostic characters : Poison fangs attached to the anterior end of the maxillary bone, usually followed by one or more solid teeth, no loreal, pupil round, tail cylindrical, ventrals broods as the body.

Genus *Enhydrina* Gray, 1849

Diagnostic characters : Headshields entire, nostrils superior, nasals in contact with one another, poison fangs followed after an interval of 3 or 4 teeth, body elongate, scales imbricate or sub-imbricate, in 49 to 66 rows on the thickest part of the body, ventrals distinct, a little broader the adjacent scales.

Enhydrina schistosa (Daudin)

1803. *Hydrophis schistosa* Daudin, *Hist. Nat. Rept.* vii, 386.
1943. *Enhydrina schistosa*, Smith, *Fauna Brit. India. Rept. Amph.* III serpentes p. 449.
1978. *Enhydrina schistosa*, Whitaker *Common Indian snakes*, p. 63.

Material examined : 1 ex. Mangrove Forest, Paradeep, 17.03.1991, T. Venkateswarlu and Party;
1 ex. Mangrove Forest, Paradeep, 18.3.1991, T. Venkateswarlu and Party.

Description : Length 735 to 780 mm, girth of the thickest 77 to 94 mm. body flattened with flat paddle shaped tail, scales rough and dull, eyes moderate, the snout end extends beyond the lower jaw resembling the beak of a bird, grayish above with faint darker cross bands, ventrals whitish.

Distribution : Coast and coastal Islands of India, Persian Gulf to the coast of China and the north coast of Australia.

Remarks : It is a deadly poisonous snake nearly four to eight times more poisonous than that of cobra. It is amphibious in habit. Antivenoms of the snake are available only in Japan and Australia.

Family HYDROPHIIDAE

Diagnostic characters : Maxillary bone with teeth behind the fangs, tail vertically compressed, paddle shaped, pupil round.

Genus *Hydrophis* Latreille

Diagnostic characters : Head shields entire, nostrils superior, nasals in contact with one another, body elongate, scales imbricate, sub imbricate or juxtaposed, ventrals distinct through out, not much broader than the adjacent scales, poison fangs followed after an interval by from 1 to 18 teeth.

Hydrophis obscurus Daudin

1803. *Hydrophis obscurus* Daudin, *Hist. Nat. Rept.* VII p. 375.

1943. *Hydrophis obscurus*, Smith, *Fauna Brit. Ind. Rept. Amph.* III p. 457.

Material examined : 1 ex. light house side, Paradeep, 22.7.1990, T. Venkateswarlu and Party.

Description : Length 848 mm. girth of the thickest 53 mm. head small with slender body, 19-23 scales rows on neck and 29-37 on the body with faint dorsal bars, tail flat, 7 maxillary teeth behind the poison fang; curved yellow mark on the head present; ventrals yellowish and dorsals blackish.

Distribution : From east coast of India to the coast of Burma.

Remarks : It is deadly poisonous snake commonly found in estuaries during monsoon period.

SUMMARY

During extensive surveys of Mahanadi Estuary from 1989 to 1992 a total of 4 species under 4 genera belonging to 4 families have been collected. Their distribution and systematic accounts are given in the present paper.

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SHORE LINE INSECTS

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INTRODUCTION

The shore-line insect fauna of Mahanadi was not worked out earlier. Hence extensive surveys were undertaken of Mahanadi estuary from 1989 to 1992. Vigorous efforts were made to have an exhaustive collections of the shore line insects from the area but only 3 species have been found during course of the studies. These 3 species have been recorded for the first time from Mahanadi estuary.

The shore-line insects were observed to be more prevalent near the mouth of Mahanadi and mouth region of Devi river. They were available mostly on sandy shore of the estuary.

Practically there is no work on shore-line insects of Mahanadi estuary. Distant (1906), Fowler (1912), Prasad (1975), Vazirani (1984) and Thirumalai (1994) are the major contemporary works on the aquatic insects of Indian region.

SYSTEMATIC ACCOUNT

Order COLEOPTERA

Family CICINDELIDAE

Cicindela biramosa Fabricius, 1781

Cicindela biramosa, Fabricius, 1781, *Spec. Ins.* i, p. 286.

Cicindela tridentata, Thunberg, 1784. *Nov. Ins. Sp.* p. 26, fig. 40.

Cicindela biramosa var, *Contracta*, Flentiaux, 1893. *Ann. Soc. Ent. France*, p. 488.

Cicindela biramosa, Fowler, 1912. *The Fauna of British India including Ceylon and Burma; Cicindelidae and Paussidae*, p. 431-432.

Material examined : 4 exs., mouth area, Mahanadi, Paradeep, 25.11.1990, Coll. D. S. Mathur and party; 6 exs., mouth area, Mahanadi, Paradeep, 26.11.1990, Coll. D. S. Mathur and party; 6 exs., mouth area, Mahanadi, Paradeep, 28-11.90, Coll. D.S. Mathur & party; 5 exs; middle area, Mahanadi, 29.11.1990, Coll. D. S. Mathur and party; 5 exs, middle area near creek, Mahanadi, Paradeep, 30.11.1990, Coll. D. S. Mathur and party.

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Description : Length 11-14 mm, shining and smooth dark, bronze-green with a coppery reflection noticeable mainly on the head and pronotum; Labrum testaceous, head finely striated within the eyes; eyes large and prominent; pronotum as long as broad, with the sides gently rounded, finely sculptured, central line distinct but not strongly marked; elytra very shiny, sparsely sculptured, more distinctly in front than behind, with an irregular row of larger punctures near the suture, dark, with the margins more or less broadly white from the shoulder to the apex; from the margin at about the middle proceeds a blunt transverse spot reaching to about the middle of the disc, the hinder white portion is thickened at its apex; the space forming a lunule continuing the margin; legs coppery and green, tarsi dark, metallic; underside coppery, green and violaceous, almost bare in the centre, with thick but very fugitive pubescence at the sides; genae bare, sides of prosternum with large punctures.

Distribution : Sunderbans, W. Bengal, Orissa, Andaman Islands; Burma; Bangladesh; Sri Lanka; Tenasserim; Malacca and China.

Remarks : This species of insect is found on sea-shore. The food of this species of insect seems to consist largely of insects which have fallen into the sea, or live naturally on the surface and are washed ashore. *C. biramosa* is very active on the wing and is collected with much difficulties. This species of insect has been observed flying by night as well as day. On clear observation it has been found that *C. biramosa* is not available on every sandy shore within its range of distribution. This species is recorded for the first time from Mahanadi estuary.

Family GYRINIDAE

Orectochilus Sp.

Orectochilus Eschscholtz. 1883, in *Dejean's catalogue Coleoptera*, ed II, p. 59.

Orectochilus, Vazirani, T. G. 1984. *The Fauna of India. Coleoptera. Family Gyrinidae and Haliplidae*. Zool. Surv. India, p. 76.

Material examined : 4 exs., Devi river mouth region, Gandakula, Machagaun, Cuttack, 27.11.1990, Coll. D. S. Mathur and party.

Diagnostic characters : Scutellum visible at least in one of the sexes, apical segment of protarsi less than one and a half times longer than the preceding segment.

Remarks : It is a very large genus occurring in tropical countries of Asia. Only one species occurs in Africa and Europe. It generally occurs in running waters, streams and occasionally in peennial ponds.

Order HEMIPTERA

Sub-order HETEROPTERA

Family NEPIDAE

Laccotrephes griseus (Guerin)

Nepa griseus Guerin, 1844. *Iconogr. Regne. Anim. Ins.*, 352.

Laccotrephes griseus (Guerin) : Distant, 1910b. *Fauna British India*, 5 : 314.

Laccotrephes griseus, Thirumalai, 1994. *Rec. Zool. Surv. India. Occ. Paper No.* 165 : 21.

Material examined : 1 ex., Devi river mouth region, Gandakula, Machagaun, Cuttack, 27.11.1990, Coll. D. S. Mathur and Party.

Description : Length 16 mm; tubercle strongly acute, situated at the anterior area of prosternum, femora base characterized by a rounded tooth; abdominal appendages shorter than the body.

Distribution : India; Malaysia; Myanmar; Seychelles; Sri Lanka; Thailand.

Remarks : Sluggish species found under weeds collected near the shore line of the estuary. This species is recorded for the first time from Mahanadi estuary.

SUMMARY

During extensive surveys of Mahanadi Estuary from 1989 to 1992, 3 species under 3 genera belonging to 3 families have been collected which are new records from Mahanadi estuary. Their systematic account along with distribution is given in the present paper.

ACKNOWLEDGEMENT

I am thankful to the Director, Zoological Survey of India, Calcutta and Officer-in-Charge, Estuarine Biological Station, Zoological Survey of India, Berhampur for providing facilities and constant encouragement.

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HERMIT CRABS (CRUSTACEA : DECAPODA)

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INTRODUCTION

Hermit crabs collected from Mahanadi estuary by the Estuarine Biological Station, ZSI, Berhampur were studied. The material consisted of 36 specimens belonging to 4 species, 3 genera and 2 families. Systematic account of the species identified is given below.

LIST OF SPECIES IDENTIFIED

Class CRUSTACEA

Order DECAPODA

Family DIOGENIDAE

1. *Clibanarius padavensis* de Man
2. *Cl. olivaceus* Henderson
3. *Diogenes custos* (Fabricius)

Family COENOBITIDAE

4. *Coenobita cavipes* Stimpson

SYSTEMATIC ACCOUNT

Key to the species known from Mahanadi estuarine system

1. Antennular flagella end in a filament 2
- Antennular flagella end abruptly and bluntly *Coenobita cavipes*

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2. Fingers of chelipeds opening and closing horizontally 3
- Fingers of chelipeds opening and closing obliquely or nearly vertically *Diogenes custos*
3. Red longitudinal stripes present on eyestalks, walking legs, though less distinct and sinuous on chelipeds *Clibanarius padavenis*
4. Red longitudinal stripes absent on eyestalks, walking legs and chelipeds *Cl. olivaceus*

1. *Clibanarius padavenis* de Man

1888. *Clibanarius padavenis* de Man, *J. Linn. Soc (Zool.)*, **22** : 242

1989. *Clibanarius padavenis* : Thomas, *J. mar. biol. Ass. India*, **31** : 65.

Material : 1 ex., Mouth of Mahanadi, Paradeep, 25.vii.1989, T. Venkateswarlu; 2 exs., Mahanadi Mouth, Paradeep 3.xii.1989, D. S. Mathur; 2 exs., Mangrove forest, Hukitola, 10.ii.1990, C.A.N. Rao; 1 ex., Mahanadi mouth, Paradeep, 19.ii.1990, C.A.N. Rao; 2 exs., Astaranga Fishing Jetty, Near Navaghar, 19.ii.1990, C.A.N. Rao; 2 exs., Astaranga, Devi River, 20.ii.1990, C.A.N. Rao; 1 ex., Near Light House, Paradeep, 21.vii.1990, T. Venkateswarlu; 2 exs., Mangrove forest, Paradeep, 23.vii.1990, T. Venkateswarlu; 1 ex., Mouth of Mahanadi, Paradeep, 27.vii.1990, T. Venkateswarlu; 2 exs., Batighar, Paradeep, 19.x.1990, C.A.N. Rao; 7 exs., Hukitola, Paradeep, 20.x.1990, C.A.N. Rao; 2 exs., Mangrove forest, Paradeep, 21.iii.1991, T. Venkateswarlu.

Diagnosis : Eyestalks as long as the antennular peduncles but about one-sixth longer than the anterior border of the carapace.

Chelipeds equal, 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.

Distribution : India – It is reported from the mouth of River Hugli, Sundarbans, Junput and Digha (West Bengal); Chilka Lagoon (Orissa); Waltair (Andhra Pradesh); and Adyar River mouth – Madras, Madras beach, Vellar estuary-Porto Novo, Athankarai estuary – Palk Bay, Rameswaram and Tuticorin (Tamilnadu).

Remarks : It is found as a common form on the exposed mud flats and along mud banks of channels and creeks at the estuary proper. It is seen occupying the dead mollusc shells, which it occupies for protecting its soft abdomen and laboriously dragging them while moving; catches the immediate attention of any casual visitor to a river mouth.

2. *Clibanarius olivaceus* Henderson

1915. *Clibanarius olivaceus* Henderson, *Rec. Indian Mus.*, **11** : 26.

1935. *Clibanarius olivaceus* : Reddi, *Curr. sci.*, **3** : 561.

Material : 1 ex. Gangolia, Mahanadi Estuary, 11.ii.1990, C.A.N. Rao; 2 exs., Near New Fishing Jetty, Astaranga, Devi River, 17.ii.1990, C.A.N. Rao; 2 exs., Mangrove forest, Mouth of Mahanadi, 24.vii.1990, T. Venkateswarlu.

Diagnosis : Eyestalks as long as the antennular peduncles but distinctly longer than the anterior border of the carapace.

Chelipeds subequal and similar. The hand with a few scattered granular tubercles and free of setae in comparison to *Cl. padavensis*. No spines on the entire palmar surface. The fingers rougher becoming spinous towards the tips and more setose than the palm. The length of the hand including the fingers is almost twice its breadth.

Distribution : India – It is reported from the mouth of Hugli River, Sundarbans, Junput and Digha (West Bengal); Chilka Lagoon (Orissa); Madras and Vellar estuary – Porto Novo (Tamilnadu) and Andamans.

3. *Diogenes custos* (Fabricius)

1798. *Pagurus custos* Fabricius, *Ent. Syst. Suppl.*, p. 412.

1989. *Diogenes custos* : Thomas, *J. mar. biol. Ass. India*, 31 : 73.

Material : 1 ex., Paradeep, 19.ii.1990, C.A.N. Rao.

Diagnosis : Rostrum about half the length of the eyestalks with its free edge spinose. Antennular and antennal peduncles of equal length. Antennal acicle bifurcate, the outer prong extends well beyond the base of the terminal joint of the peduncle.

Chelipeds and exposed surface of legs finely granular; borders of segments of chelipeds as well as the interior border of the four terminal joints of the 2nd and 3rd legs spinose. The granules on the outer surface of the propodus of 2nd and 3rd legs arranged in transverse rows.

Distribution : India – It is reported from sandheads – off the mouth of River Hugli and Digha (West Bengal); Waltair (Andhra Pradesh); Madras, Cuddalore, Porto Novo, Nagapattinam, Palk Bay and Rameswaram (Tamilnadu) and Andamans.

4. *Coenobita cavipes* Stimpson

1859. *Coenobita cavipes* Stimpson, *Proc. Acad. Nat. Sci. Philad.*, p. 245.

1950. *Coenobita cavipes* : Barnard, *Ann. South African Mus.*, 38 : 470.

Material : 1 ex., Paradeep, 24.vii.1989, T. Venkateswarlu; 1 ex., Near Light House, opp. Paradeep, 14.ii.1990, C.A.N. Rao; 1 ex., Mangrove forest, Hukitola, 19.vii.1990, T. Venkateswarlu; 1 ex., near Light House, Paradeep, 21.vii.1990, T. Venkateswarlu; 1 ex., mouth of Mahanadi, 27.vii.1990, T. Venkateswarlu.

Diagnosis : Eye stalks compressed, dorsally punctate, reaching the base of the terminal joint of the antennular peduncle and nearly to the middle of the last joint of the antennal peduncle. Antennal acicle fused with the second joint of the peduncle.

Chelipeds and legs relatively smooth. Upper part of the outer surface of the left palm without any oblique file of upright laminar teeth (stridulating mechanism, a characteristic feature of *C. rugosus*) but studded with vesicular granules with corneous tips; the lower part quite 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 crest, the dactylus somewhat compressed and its outer surface flat.

Distribution : India – It is reported from the Southern part of Sundarbans (West Bengal); Chilka Lagoon (Orissa); Madras; Porto Novo and Krusadai Is. (Tamilnadu) and Andamans and Nicobar Is.

Observation : hermit crabs in general are marine forms, but among the few which can survive in brackish water, *Clibanarius padavenis* is the species well adapted to estuarine conditions and found as a common form in the major estuarine bodies of India.

Species of the genus *Coenobita* are adapted to terrestrial conditions and can survive on coastal forest land but nearer to sea water. They are approximately called as land hermit crabs. Appearance of this genus on Indian coast, is gradually declining due to increased human interference on their habitat. In the coastal forests of Andamans, there are 4 species of this genus (Reddy and Ramakrishna 1972) but on the mainland of India, only one species is being reported.

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CRUSTACEA

MAYA DEB

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INTRODUCTION

Mahanadi River mouth collections made by Estuarine Biological Station at Berhampur, Orissa, comprising 147 packets of Crustacea of eight Surveys. These large collections comprise of Prawns belonging to two families, Crabs of eight families and Stomatopods of one family. These materials have been studied because of greater interest in Orissa Coastal Survey collections as no such huge collections of Crustacea have so far been made in the present century. All the 44 species of Prawns and Crabs are common coastal Crustaceans, except one species of Crab recorded for the first time from India (marked with asterix).

SYSTEMATIC ACCOUNT

Order DECAPODA

Section MACRURA

I. PALAEMONIDAE

1. *Palaemon (Exopalaemon) styliferus* Edw.
2. *Macrobrachium dayanum* Henderson
3. *Macrobrachium rosenbergii* (De Haan)
4. *Macrobrachium rude* Heller
5. *Macrobrachium scabriculum* (Heller)

II. Family PENAEIDAE

6. *Penaeus indicus* Edw.
7. *Penaeus canaliculatus* Edw.
8. *Penaeus mondon* Fabr.
9. *Penaeus semisulcatus* De Hann

10. *Parapenaeus rectaeus* Bate
11. *Matapenaeus monoceros* Fabr.
12. *Parapeneopsis uncta* Alcock

Order DECAPODA

Section BRACHYURA

III. Family DORIPPIDAE

1. *Ethusa indica* Alcock

IV. Family CALAPPIDAE

2. *Matuta lunaris* (Herbst)
3. *M. miersi* Henderson
4. *M. planipes* Forskal

V. Family MAIIDAE

5. *Doclea gracilipes* Stimpson

VI. Family PORTUNIDAE

6. *Charybdis feriata* (Linn.)
7. *Charybdis merguensis* de Man
8. *Charybdis riverandersoni* Alcock
9. *Portunus pelagicus* (Linn.)
10. *Scylla serrata* (Forskal)

VII. Family XANTHIDAE

11. *Demia india* Deb
- *12. *Demia scaberrima* (Walker)

VIII. Family POTAMIDAE

13. *Paratelpusa (Oziotelpusa) hydrodroma* (Herbst)

IX. Family OCYPODIDAE

14. *Dotilla brevitarsis* De Haan
15. *Ocypoda macrocera* Edw.
16. *Macrophthalmus depressus* Ruppell
17. *Uca annulipes* Edw.
18. *Uca acutus* (Stimpson)
19. *Uca lacteus* de Haan
20. *Uca triangularis* Edw.

X. Family GRAPSIDAE

21. *Grapsus albolineatus* (Lamarck)
22. *Metaplax indica* Edw.
23. *Metaplax crenulata* Gerst.
24. *Metopograpsus messor* (Forsk.)
25. *Sesarma bidens* (De Haan)
26. *Sesarma quadrata* Fabr. = *plicatum* (Latreille)
27. *Sesarma taeniolatum* white = *mederi* Edw.
28. *Sesarma tetragona* white
29. *Varuna litterata* Edw.

Order STOMATOPODA

Family SQUILLIDAE

30. *Plagusia depressa squamosa* (Herbst)
31. *Oratosquilla nepa* (Ltr.)
32. *O. holoschista* (Kemp)

1. Family PALAEMONIDAE

1. Genus *Palaemon* Fabricius 1798

Body slender or robust, compressed. Rostrum well developed, compressed with teeth on both sides, carapace smooth, with antennal and branchioslegal, spines on lower anterior corner of carapace. Abdomen smooth, pleurae of first three joints broadly rounded, of 4th and 5th joints narrow, of 5th, 6th joints spine tipped.

Telson elongate, triangular, with two pairs of dorsal spines, one or both pairs may be absent also. Telson acute on posterior edge, bears a pair of feathery-setae at middle and 4 spines, outer pair shortest. These also may be absent.

Prawns of Mahanadi river mouth can be grouped into two families. Palaemonidae (Fresh & Brackish water) and Penaeid (Marine). Both the families can be characterised as follows :

1. Plurae of 2nd abdominal joint overlapping those of first and third joints. No Chela on third leg. Body not much compressed laterally, Carpus of 2nd leg entire, no epipod on legs, Gills phyllobranchiate Palaemonidae
2. Plurae of 2nd abdominal joint overlapping those of 1st joints, 3rd leg with a chela. Laterally compressed body. Last two pairs of walking legs well developed, gills many, salt water shrimps Penaeidae

Subgenus *Exopalaemon* Holthuis 1950

Branchiostegal groove look like a sharp line. Dactyli normal, as long as propodus but shorter than Nematopalaemon, and the stylocerite has no dorsal tooth.

1. *Palaemon (Exopalaemon) styliferus* Edw.

Palaemon styliferus H. Milne Edwards 1840, *Hist. nat. Crust.* 3 : 638.

Leander styliferus Kemp 1925, *Rec. Indian Mus.*, 27 : 289

Palaemon (Exopalaemon) styliferus Holthuis 1950, *Siboga Exped*, Pt.X, 39 : 46.

Material seen : 1 ex.

Diagnosis : Small, slender smooth shrimp. Rostrum straight, very long, reaches upto the end of swollen chela of 2nd walking leg, 6-7 teeth on the basal convex creast on upper edge, middle of the upper edge dent free, one subterminal small dent present, 17 equidistant teeth present on lower straight edge of rostrum. Basal antennal spine strong. No spines on dorsal surface and lateral edges of telson.

Palm of second male walking leg swollen, 7-8 mm in length, laterally compressed. Fingers twice as long as palm, narrow, spine like, hooked at tip.

Distribution : Widely distributed in Indo West Pacific region; Dhappa near Calcutta, Mahanadi river mouth, East West Coasts of India.

Habit : Slightly brackish water, shallow coasts and salt water, also in fresh water (Kemp, 1917).

Remarks : 2-3 inches in length of shrimp from tip of rostrum (80-90 mm) to tip of telson. Basal convex crest of rostrum with 6-7 close teeth and 17 teeth on lower edge. Palm of 2nd chela swollen.

Status : Common.

II. Genus *Macrobrachium* Bate 1868

Diagnosis : Slender or robust body. Rostrum well developed with spines on both edges, serrate and laterally compressed, hairs present between the teeth. Carapace smooth in young. In adults of some species numerous close minute spinules present on carapace and chelae but not on the abdomen, except on *M. idae* Heller. Hepatic spine present, Branchiostegal spine absent. Dactylus of last three legs simple. Carpus of 2nd leg shorter or as long as or longer than merus. A distinct adrostral elevated crest present on carapace of some species while absent in others. The distal 1/3 or 1/4 of upper edge of rostrum usually dent free.

Remarks : The species of the genus can be separated by their rostrum and second pereopods (Chela) of adult males. Juveniles of all the species are almost alike hence difficult to study and ascertain their correct identity.

Distribution : Fresh, Brackish and Salt waters of Indo West Pacific Region.

Key to the species of *Macrobrachium*

1. Rostrum very long, double curved, chela narrow *rosenbergii*.
- Rostrum short, chela stout, long or medium 2
2. Rostrum horizontal, triangular, sloping apically 3
- Rostrum slightly bent upward in adult *dayanum*
3. Surface of head and short chela closely covered with minute sharp spinules *scabriculum*

2. *Macrobrachium rude* (Heller)

Palaemon rudis Heller 1862a. *Verh. Zool. bot. Ges. Wien*, 12 : 525.

Palaemon rudis Kemp. 1915, *Mem. Indian Mus.*, 6 : 268.

Macrobrachium rude Holthuis, 1950, *Siboga Exped.*, Pt.X, 39 : 150.

Material seen : 35 exs.

Diagnosis : Four-five inches long in adult stage, head larger, surface of entire animal smooth shiny, abdomen short, narrow. Rostrum 5 mm shorter than antennal scale, ad-rostral crest does not reach on middle of carapace. Rostrum apically sloping downward, upper edge with 11-12 teeth, 1st tooth on carapace, 2nd tooth just above the orbital edge apex directed forward; Lower edge with 4 teeth. Antennal and hepatic spines sharp. Right chela of adult male 7 inches long; arm 1.25", wrist-2.2" Palm 2.5" in length, palm narrow, laterally compressed, slightly longer than non gaping fingers, proximal ends of both the fingers with 2 small inter locking teeth. Apex of fingers acute and hooked. Two pairs of spinules on dorsal surface of telson, but lateral sides dent free.

Habitat : Estuarine, brackish and coastal water.

Distribution : East coast of India, Ganges to Cochin, Sri Lanka; Africa and Madagascar.

Remarks : Surface of entire prawn smooth, shiney, rostrum, short, narrow, triangular, adult male chela very long., narrow and fingers unlike the *M. rosenbergii*, a closely allied species.

Status : Common.

3. *Macrobrachium dayanum* (Henderson)

Palaemon dayanus Henderson, 1893, *Trans. Linn. Soc. London* (2) V; 443.

Macrobrachium dayanum Holthuis, *Siboga Exped.* Pt.X, 39 : 197.

Material seen : 1 ex.

Diagnosis : Stout shrimp in adult stage, rostrum shorter than antennal scale, its shape variable. In most young specimen rostrum straight narrow, in adult distinctly upturned at its distal end. 5-7 or 11 teeth on upper edge, and 4-7 teeth on lower edge. 2 or 3 teeth on carapace, 3rd tooth placed just above the orbital border. Carapace smooth, hepatic spine small, there is a sulcus behind it, 2nd chela stout in adult male, chela equal or longer than carpus. Fingers 2/3 of the palm and densely hairy in adult. Palm little compressed laterally.

Distribution : Most common species in freshwaters of India, Bangladesh and Pakistan.

Habitat : Fresh water sources, Hill streams, river mouths.

Remarks : Short stout rostrum as well as body in adult males, in sub adult and young ones variations are noticeable.

Status : Abundant after breeding season.

4. *Macrobrachium rosenbergii* (De Man)

Palaemon carcinus Fabricius 1978, *Suppl. Ent. Syst.* : 402.

Palaemon rosenbergii De Man 1879, *Notes Leyden Mus.*, 1 : 167.

Macrobrachium rosenbergii Holthuis, 1950 :-111.

Material seen : 3 exs.

Diagnosis : Large 5.2 inches or more from tip of rostrum to telson. Surface of prawn smooth, shiny. Rostrum very long, double curved, diagonally directed upward apically, upper edge with 13 and lower edge with 12 teeth, 2 teeth on carapace and 3rd tooth that on the orbital edge. Both antennal and hepatic spines present. Chela 3 inches long, smooth narrow, carpus (Wrist 80 mm, Palm 65 mm, fingers 45 mm). Fingers not all gape, tips hooked, cutting edges dent free, surface smooth. Postero dorsal surface of telson covered with fine pickles, 2 pairs large, lateral sides of telson dent free.

Habit and Distribution : Fresh water prawn, occur in brackish and salt water of Indian Ocean; East West Coasts of India, Punjab, Surat, Bombay, Cochin; Sri Lanka; Burma, Mergui, Indonesia Hong Kong; New Guinea; N. Australia and Christmas Islands.

Remarks : Very long double curved rostrum diagonally curved upwards distally, surface of carapace, abdomen and appendages smooth.

Status : Common.

5. *Macrobrachium scabriculum* (Heller)

Palaemon scabriculus Heller 1862. *Verh. Zool. Bot. Ges. Wien*, 12 : 527 : Henderson and Matthai 1910, *Rec. Ind. Mus.*, 5 : 300.

Macro-brachium scabriculum Holthuis, 1950 : 224.

Material seen : One ex.

Diagnosis : Carapace much larger than the short narrow smooth abdomen, surface of carapace covered with minute sharp pickles or spinules. Rostrum shorter than antennal scale, slightly slopping or bent downward apically. Upper edge with 13 teeth, and only 2 teeth on lower edge. 4 teeth behind the orbital edge, 5th one just above orbital edge. Rostral crest extent almost upto the middle of carapace. Abdomen smooth narrow and short. Male 2nd walking leg of right side very long and stout, robust, 3.50" inches in length. Surface of arm, wrist rough with sharp pickles and surface of palm smooth. Wrist 1/2 inch, palm one inch long; fingers with sharp pickles, little shorter than palm, widely gaping, meet at hooked tips, cutting edges evenly dentate; in youngs and females carapace and chela not robust and rough with pickles.

Habitat : Freshwaters of India, also estuarine and brackish water.

Distribution : Regions around Indian Ocean, Indonesia and Africa.

Remarks : Attain 3 inches long size with remarkably large head and stout robust adult male chela of one side. In sub-adult and early stages head and one chela not much enlarge or stout.

Status : Common in both coastal and brackish water.

II. Family : PANAEIDAE

Key to the Genera of *Panaeidae*

1. Rostrum without ventral teeth 2
- Rostrum with Ventral teeth *Panaeus*
2. Rostrum straight, short, body covered with short thick stiff hairs on surface *Metapaneus*
- Rostrum curve, surface hairs absent 3
3. From post orbital edge one longitudinal fine suture extend to posterior margin of carapace
..... *Parapeneopsis*
- No such fine long suture present on lateral margin of carapace *Peneopsis*

***Penaeus canaliculatus* Olivier**

Penaeus canaliculatus Olivier, 1811, *Encyclo, Metho, VII*, 660, Alcock 1906, *Cat. Indian Decapod Crust. Ind. Mus.*, pt. 3:14.

Material seen : 3 exs.

Adrostral carina reaching to posterior border of carapace. Gastro frontal carina present. Two longitudinal grooves or canals runs on either side of rostral crest on carapace.

Double curved long rostrum with one ventral, 9-11 dorsal teeth. Telson without 3 pairs of spinules.

Distribution : Andamans, Coasts of West Bengal, Orissa, Japan and Fiji Island.

Habitat: Salt water, coastal and estuarine also.

Remarks : 6-7 inches long, with two longitudinal very fine sutures are grooves runs on either side of rostral creast.

Status : Common species of eastern India and Andamans.

***Penaeus indicus* Edw.**

Penaeus indicus H. M. Edwards, 1837, *Hist. Nat. Crust. II* : 415; Alcock 1906 : 12.

Material seen : 98 exs.

Both gastro frontal and Hepatic carina absent. Adrostral carina not reaching behind middle of carapace. Rostral crest may be elevated in adults but not triangular in profile, double curved in adults; 8-10 dorsal and 4-6 ventral teeth. Post antennular and hepatic spines small. Apical 1/3 or 1/4 of rostrum dent free.

Distribution : All round the coasts of Andamans, India, Sri Lanka, Bangladesh, Singapore and Pakistan.

Habitat : Saltwater and estuarine species.

Remarks : 6-8 inches in length.

Status : Very common and economically important species.

***Penaeus monodou* Fabricius**

Penaeus monodou Fabricius, *Entom. Syst. Suppl.* 1798 : Alcock 1906 : 8.

Material seen : 3 exs.

Rostrum nearly straight with 6-8 (Generally-7) dorsal and 3 ventral teeth. Adrostral carina extend to middle of carapace, gastro frontal carina absent. Hepatic carina present, horizontally straight. No

post Ocular spine, but post antennular spine strong, continued obliquely backward as a sharp ridge. 5th leg without exopod.

Distribution : Bay of Bengal coast of India, Gulf of Martaban; Indus delta; Suez Canal.

Habitat : Salt waters of East coast of India, Pakistan, Suez Canal.

Remarks : 9-10 inches length.

Status : Very common in eastern India.

***Penaeus semisulcatus* de Haan**

Penaeus semisulcatus De Haan, *Fauna Japan. Crust.*; de Haan 1833-35, 191, Alcock 1906 : 10.

Material seen : 8 exs.

In adult rostrum double curve, 8 teeth dorsal 3 ventral present, adrostral carina extend upto the middle of carapace. Gastro frontal Carina absent. Hepatic carina slightly bent antero-ventrally. 5th walking leg with small exopodite.

Distribution : East and West coasts of India, Andamans; Mergui, Akyab, Burma; Pakistan; Sri Lanka and Japan.

Habitat : All round the coasts of India, Salt water and estuarine.

Remarks : Common in markets, economically important, size large, 8 to 12 inches in length.

Status : Commonest species in markets of Calcutta and Orissa. Coastal belt.

***Metapenaeus monoceros* (Fabricius)**

Penaeus monoceros Fabricius, *Entom. Syst. Suppl.* 1798 : 409.

Metapenaeus monoceros Alcock 1906 : 18.

Material seen : 20 exs.

Diagnosis : Covered with short, stiff thick surface hairs. Straight, upwardly directed short rostrum without ventral teeth, 9-12 dorsal teeth. No spine on antero inferior angles of carapace. No exopod present on 5th walking leg, pleurobranch present on 7th thoracic joint. Branchiocardiac sulcus distinct on posterior 1/3 of carapace. Ischial spine on 1st walking leg distinct. Telson without lateral spinules.

Distribution : East West coasts of India; Karachi; Pal strait, Gulf of Martaban; Burma and Hongkong.

Habitat : Salt water, estuarine and all round the coasts of India.

Remarks : 6-7 inches in size.

Status : Commonest Indian economically important species.

***Penaeopsis rectacuta* (Bate)**

Material seen : 1 ex.

Diagnosis : Carapace smooth, shiny, without longitudinal sutures from post orbital margin to posterior margin. Branchiostegal spine present. Rostrum without Ventral teeth faintly double curved, 7 dorsal teeth present. 3rd maxilliped without basal spine. A distal fixed pair of spines on the telson and 1-3 pairs of additional moveable marginal jointed spines also are there on telson.

Distribution : Andamans, Bay of Bengal coasts of Orissa and Tamilnadu.

Habitat : Salt water and estuarine species.

Remarks : 5-6 inches in size.

Status : Rare.

***Parapeneopsis polita* smith**

Parapeneopsis politus Smith 1881. De Man 1911, *Siboga Exped.* Pt.1. 39a : 9.

Parapeneopsis uncta Alcock 1906 : 39.

Material seen : 1 ex.

Polished, smooth shiney appearance, though finely punctate.

Diagnosis : Rostrum without ventral teeth, faintly curved; 8-9 dorsal teeth. Carapace with longitudinal sutures extending from post frontal margin to almost posterior margin. Ischial spine on second leg absent. Epipodite present on 1st and 2nd legs. Third leg without epipodite. No distal fixed pair of spines on the telson, lateral moveable spines of telson may be present. Second leg without basal spines. Telson very short.

Distribution : Bay of Bengal coast of Orissa.

Habitat : Estuarine and Salt waters of Orissa Coast; East Coast of United states; Gulf of Paria.

Remarks : Narrow, Less stout, lower antero-lateral angle rectangular.

Status : Rare.

Order DECAPODA

Section BRACHYURA

Key to the genera of *Brachyura*

1. Epistome absent or reduced. Mouth Cavity triangular in shape, narrow anteriorly. Last pair of legs abnormal or normal 2
- Epistome large or well developed. Mouth cavity quadrate. Carapace narrow triangular or broader than long, rounded or various shaped 3

2. Flat, squarish crab; First joints of abdomen dorsally visible. Last two pairs of legs reduced in size and dorsal in position. Antennae large *Dorippidae*
- Carapace rounded or broad. Walking legs normal in size and position Antennae small *Calappidae*
3. Carapace triangular, front rostrum like elongate. Epistome large. Antennules fold longitudinally covered with short thick hair coat. Legs and chelae elongate *Majidae*
- Carapace not narrowed forward, oval, rounded or square in outline, Front broad, usually broader than long. Epistome well developed. Hairy coat rare. Legs short, stout 4
4. Last legs flattened for swimming *Portunidae*
- Legs not flattened for swimming 5
5. Fresh water crab, branchial regions swollen *Potamonidae*
- Marine crab, branchial regions not very swollen. Carapace deep, broadened forward, broad transversely oval or squarish in shape 6
6. Lateral sides curved and convergent backwards *Xanthidae*
7. Maxillipeds leaves a rhomboidal gap between them *Grapsidae*
- Maxillipeds almost close the mouth, carapace with parallel lateral sides *Ocypodidae*

I. Family DORIPPIDAE White

Dorippidae white 1847 : 53; Alcock 1896, *J. Asia. Soc. Bengal*, 65 : 326; Sakai 1976 : 58.
Ethusa Roux 1828 : 81; Alcock 1896 : 281, Sakai 1976 : 62.

Carapace flat, squarish, from cut out into four teeth. Antennules fold obliquely. Buccal cavity triangular elongate, does not extend to the front.

Ethusa indica Alcock

Ethusa indica Alcock, 1896 : 228.

Seen only one damaged and juvenile specimen present, specific identification of it is impossible, may be a juvenile stage of *E. indica* Alcock which is very common in East Coast of India, only because its external orbital teeth long, projecting obliquely outwards, leads to the above conclusion.

Distribution : Mahanadi river mouth, Orissa, Gangetic Delta, Andamans; Sri Lanka; Maldives and Laccadives and Japan.

II. Family CALAPPIDAE Dana

Calappidae and *Matutidae* Dana 1852 : 393.
Calappidae Alcock 1896 : 137; Sakai 1976 : 126.

Carapace oval or sub-circular, usually with either (1) one large horizontal spine or a denticle at the junction of anteropostero lateral sides or (2) with large convex expansion of poterolateral sides over the legs. Front as wide as orbit. Antennules fold obliquely. Chelipeds equal, stout.

Three species present.

Genus *Matuta* Weber

Matuta Weber 1795 : 92; Alcock 1896 : 153; Sakai 1976 : 139.

Carapace sub-circular, depressed, with a large horizontal spine or spike at mid lateral sides. Front more or as wide as orbit, mid frontal lobe bifid, narrow, rostrum like. Antennules longitudinally fold. Chelipeds equal, stout. Legs with two terminal joints broadened and compressed for surmming. Six surface tubercles on carapace indistinct adults but not in youngsters.

Key to the species of *Matuta*

1. Front much broader than orbit. The longitudinal ridge on the dactylus or thumb finger of chelae is striated. Carapace covered with red minute dots. One large spine present at the lower proximal end of palm *lunaris*
- Front little broader than Orbit. Longitudinal ridge on the thumb of Chelae smooth, not striated. Carapace covered uniformly with red dots and irregular whitish oblong spots *miersi*

Matuta lunaris (Forsk.)

Cancer lunaris Forskal, 1775. *Desc. Animal* : 91.

Matuta victor Fabricius 1793, *Ent. Syst. Suppl.*, : Alcock 1896 : 160.

Matuta lunaris Rathbun 1902, *Proc. U.S. Nat. Mus.*, 26:30; Chopra and Das 1937, *Rec. Ind. Mus.* 39, pt. 4 : 383, Sakai 1976 : 140.

Material seen : 1 ex.

Diagnosis : Sub circular, flat, 3 wide crab with two large lateral spines, Surface of carapace smooth or finely granular or epibranchial regions, six tubercles on middle of carapace and two tubercles on mid postero-lateral sides are indistinct or distinct in juveniles. Front much broader than orbit. The ridge on dactylus of chelae straited. Lower proximal end of palm of chelae with a strong spine. Antero-lateral sides of carapace crenulated upper edge of dactylus of adult male crenular or milled.

Distribution : Andamans, Bay of Bengal Coast of India, West Coast; Sri Lanka; Karachi; Arakan; Burma; China; Japān; Australia; Red Sea and South Africa.

Habital : On sands between high and low tidal marks also from shallow waters 10-15 metres.

Remarks : Age variations of ornaments viz. red spots, strongly milled upper edge of dactylus of adult males, surface granules and presence of prominent or obscure tubercles etc. are most confusing to decide the true identity.

Status : common species of coastal and River mouth beaches.

***Matuta planipes* Fabricius**

Matuta planipes Fabricius 1798, *Entom, Syst. Suppl.* : 369 Sakai 1976 : 41.

Matuta lunaris Alcock 1896 : 161.

Material : 17 exs.

Diagnosis and Remarks : Very close to *M. Lunaris* (Froskal) but for the points below – (a) Bright yellow crab with red open rings and lines on anterior half of carapace and narrow oblong loops posteriorly (b) Surface tubercles in adult indistinct but not in youngers. Only one or a pair of tubercles present on distal lower corner of palm. (c) There is only one large spine present on outer surface of hand.

Distribution : East West Coasts of India, Andamans; Burma; Mergul; Karachi; China and Africa.

Habit : Same as former species.

Status : Very common

***Matuta miersi* Henderson**

Matuta miersi Henderson 1887, *Madras Journ. Lit. Sci.* 1986-87 : 66; 1893 : 396; Alcock 1896 : 163; Sakai 1976 : 142.

Material seen : 4 exs.

Diagnosis : Carapace and Chelaepeds with uniform red dots and worm like irregular blotches. Front broader than orbit, and median rostrum like process bidentate. Surface of carapace centre with six tubercles and granules both in young and adult. Antero-lateral sides of crab crenulate and three last crenules enlarged. No trace of tubercle on postero-lateral side. The long ridge on chelae dactylus smooth not striated.

Distribution : Mahanadi river mouth, Orissa (First record); Madras, Sri Lanka and Japan.

Habit : Soft muddy beach upto 9 cms.

Status : Common in Peninsular east coast of India.

Remarks : Small size 20 mm. to 30 mm. wide. Carpus of 3rd pair of legs not compressed, indistinctly biacriate dorsally, *M. banksii* is close to *miersi*.

Family MAJIDAE Samouelle

Maiadae Samouelle 1819 : 88 (not seen)

Majidae Rathbun 1925 : *Bull. Us. Nat. Mus.*, 129. Sakai 1976; *Crabs of Japan and adjes. Seas* : 153.

Maiidae Alcock 1895, **64** : 160.

Carapace narrowed in front and produced to form a rostrum. Hepatic regions narrow, branchial regions more developed. Epistome large, buccal cavity quadrate. Antennules folded longitudinally Basal joint of antenna well developed. Chelipeds much longer than the other legs. Eye stalks long and orbits

may be incomplete or complete.

Genus *Doclea* Leach

Doclea Leach 1814. *Zool. Miscel.* II : 41; Alcock 1895, 64 : 225; Chopra 1935, *Rec. Ind. Mus.* 37 : 467; Sakai 1976 : 230.

Diagnosis : Carapace globular/sub circular in shape, convex. Entire dorsal surface of carapace and merus, carpus of legs covered thickly with short fur. Rostrum 1/4 - 1/7 of carapace in length, deeply cleft spines may be in contact or little divergent distally.

Doclea gracilipes Stimpson

Doclea gracilipes 1857, Stimpson 1857, *Proc. Ac. Nat. Sci.* 216; Alcock 1895 : 229.

Material seen : 3 exs.

Diagnosis : Half ball like carapace armed with four claw like, curved spines on antero-lateral sides, a series of spines or tubercles on the middle line and last spine on posterior border largest. Chelipeds short, slender in female; longer, stout with enlarged palms in adult male. No canal present on pterygostomian regions i.e. region below antero-lateral sides.

Remarks : Discoid carapace, second pair of legs three to four times the length of carapace. A single series of tubercles or spines down the mid-dorsal line of carapaces, all these characters are very species specific.

Family PORTUNIDAE Rafinesque

1815. *Portunidae* Rafinesque 1815 *Anyl. natur. tabl. Univers. Organ.*, 124; Alcock 1899, 68 : 5; Sakai 1976 : 322.

Diagnosis : Carapace slightly convex or depressed, usually much broader than long and various shape. Regions not well outlined, seldom areolated. Right chela often stouter than left. Last pair of legs flattened and adapted for swimming. First antennae fold transverse or oblique.

Key to the genera of *Portunidae*

1. Antero-lateral sides of crab with six teeth *Charybdis*
- Antero lateral sides of crab with nine stout teeth 2
2. Surface of crab and its stout chelae smooth, palm swollen smooth. Regions not defined *Scylla*
- Surface of carapace not smooth, regions faintly outlined; hand coastate *Portunus*

Genus *Scylla* De Haan

Scylla De Haan : 11; Alcock 1899, 68:27; Sakai 1976 : 335.

Scylla serrata (Forsk.)

Cancer serratus Forskal 1755, *Descr. Animal* : 90 (not seen)

Scylla serrata De Haan 1833 : 44 : Alcock 1899, 68 : 27; Kemp 1918, *Mem. Asia. Sec. Bengal*, 6 : 250 : Sakai 1976 : 335.

Diagnosis : Carapace two third as long as wide, thick, convex, smooth. Regions not defined. Four blunt equal front 1 teeth. Nine sharp teeth present on antero lateral sides:

Chelipeds in adult male stout, unequal but not in female and young male. Male abdomen broadly triangular.

Habit : Mud flats of estuaries.

Distribution : Mahanadi and other estuaries and backwaters of India; Bangladesh, Karachi to Mergui; Indonesia, Philippines; China, Japan; Hawaii; East and South Africa.

Remarks : Most common edible crab, grows to a large size. In young, carapace sub circular, frontal teeth broad, upper edge of palm with two faint coxae. *Scylla serrata* is a single representative species from Indo-Pacific area.

Status : Very common.

Genus *Portunus* Weber

Portunus Weber 1975, *Nomen, entomo.* : 93 (not seen); Sakai 1965 : 116; 1976 : 336.

Neptunus De Haan 1833 : 7, Alcock 1899, 68 : 28; Sakai 1939 : 385.

Carapace broad, less than half as long as wide, bare. Covered with granules. Frontal spine four + supra orbital spines. A spine at the lower distal end of merus/arm of cheliped. Last antero-lateral teeth four times as long as the other teeth.

Portunus (Portunus) pelagicus (Linn.)

Cancer pelagicus Linnaeus 1758, *Syst. Nat.*, : 626 (not seen)

Neptunus (Neptunus) pelagicus Alcock 1899, 68 : 34; Kemp 1915, *Mem. Ind. Mus.* 5 : 248. Chhapgar 1957, *J. Bombay Nat. Hist. Sec.*, 54 : 418.

Portunus (Portunus) pelagicus Sakai 1976 : 339.

Material : 2 exs.

Diagnosis : Carapace large, very broad, length little more than half of the width, little convex, closely covered with granules. Antero-lateral sides long, with nine spines, last spine long. Chelipeds in male stout, palm swollen. Arm with 3 spines on anterior edge, one on posterior distal end. Hand and outer side of wrist costate, costae granular. 3 spines on palm. Colour reticulate bluish and purple coloured.

Distribution : All coasts of India; Bangladesh; Pakistan; from Penang to Persian Gulf; Suez; Hongkong; Japan and Australia to Red Sea.

Habitat : Muddy, sandy bottoms, upto 30-50 metres.

Remarks : Absence of three large red spots on carapace separate the species from nearest allies.

Status : Common.

Genus *Charybdis* De Haan

Charybdis and *Oceanus*, De Haan 1833 : 10 (not seen)

Charybdis Alcock 1899, 68 : 47; Sakai 1939 : 398; 1965 : 120; 1976 : 353.

Diagnosis : Hexagonal, broad crab, flat or little convex, usually with transverse granular ridges on anterior half. Front 1/3-1/4 of width of carapace, with six teeth other than inner supra orbital angles. Antero-lateral sides oblique, with six teeth or 5-7 rarely. Cheliped stout, slightly unequal, a strong spine at inner angle of wrist, spinules on outer sides, palm swollen, costate, spines on upper edge, fingers with strong teeth. Male abdomen broadly triangular.

Key to the species of *Charybdis*

1. First spine of antero-lateral side acute, sides of 6th abdominal tergum of male parallel
..... *merguiense*
- First spine of antero-lateral sides broad truncate, sides of 6th male abdominal tergum concave and gradually convergent 2
2. First antero-lateral spine oblique *riversandrsoni*
- First antero-lateral spine notched anteriorly *feriata*

Charybdis (Charybdis) feriata (Linn.)

Cancer feriatus Linnaeus 1758; *Syst. Nat.* ed. 10 : 627 (not seen).

Charibdis Crucifer Dana 1852 : 286.

Charybdis (Gonisoma) crucifera, Alcock 1899 : 51.

Charybdis cruciata Sakai 1965 : 123.

Charybdis (Charybdis) feriata Sakai 1976 : 357.

Material : 4 exs.

Diagnosis : Carapace two third as long as wide, slightly convex, smooth, hairs absent. Transverse ridges on anterior half become faint with age but three brown longitudinal band on dorsal surface well marked. Six blunt regular frontal teeth other than supra orbital corner, antero-lateral teeth six, first one notched. Stout chelipeds little unequal in size; stout palm swollen, five costae and four spine on upper edge. 2nd and 3rd terga of abdomen costate.

Distribution : Indian coasts; Madagascar; East coast of Africa; Japan to Australia.

Habitat : 10-30 meters deep coastal water.

Remarks : *C. feriata* (Linn.) a large crab with three longitudinal brown band on smooth dorsal surface is significant.

***Charybdis (Charybdis) rivers-andersoni* Alcock**

Charybdis (Goniosoma) rivers andersoni Alcock 1899:53.

Charybdis (Charybdis) rivers-andersoni Sakai 1976 : 358.

Material : 4 exs.

Diagnosis : Almost like former species *C. feriata*, except the red colour with ceramy spots, dark brown fingers and acute frontal teeth. Smooth hairs absent, gastric and branchial regions swollen, above the general dorsal surface.

Distribution : Konkan, Orissa, Bay of Bengal coast end

Habitat : 30-100 metres deep muddy, sandy bottom.

Remarks : White spotted Bright red colour with dark fingers along with acute frontal teeth.

Status : Rare.

***Charybdis (Charybdis) merguiensis* de Man**

1887-88 *Goniosoma merguiense* de Han, *J. Linn. Soc. Zool.* XIII : 82.

1899 *Charybdis (Goniosoma) merguiensis* Alcock, 1895, 68 : 55.

Material : 2 exs.

Diagnosis : First spine of antero-lateral side acute, from base of last spine a transverse ridge cross dorsal surface, no such ridge present behind the former ridge. Frontal teeth six, in adult more acute. An acute spine present on distal end of posterior border of carpus of last pair of legs. Sides of sixth abdominal tergum of male parallel or slightly divergent in two-thirds or more of their extent.

Distribution : Orissa, Mahanadi estuary; Andamans; Singapore; Mergui; Hongkong; Karachi and persian Gulf.

Remarks : The species is very close to *c. quadrimaculata* except that last antero-lateral spine is often more prominent than the former.

Status : Rare.

Family XANTHIDAE (Alcock) Macleay

Xanthidae Macleay 1838, *Illust. Zool. S. Africa Inv., London* : Alcock 1898, 67 : 69; Sakai 1939 : 440; 1976 : 395; Serene 1984 : 11.

Diagnosis : Carapace almost always broader than long, various type of shape. Front broad, never spine or rostrum like. Anterior edge of buccal cavity well defined, not covered by maxillipeds. Legs use for walking.

Only two species of the genus *Demania* present from Mahanadi River mouth and five species of the genus before from Orissa coast. The species of the genus are poisonous to man.

Genus *Demania* Laurie

Demania Laurie 1906, *Ceylon Pearl. Oyster. Fish. Rep.* London : 396; Serene 1969 : 1; 1984:185; Guinot 1977a:83, Sakai 1976:420; Deb 1986, *Rec. zool. Surv. Ind.*, 83 : 127.

Carapace pentagonal or broad in shape, small or very large in size, 7 mm - 84 mm broad specimen reported from Orissa coast. Slightly or more convex, regional lobules always well separate by grooves, entire or only posterior third covered with small or large scale like tubercles or just rough, smooth anteriorly in very large specimens. Four antero-lateral lobes. Front-narrow, horizontal or conical. Chelipeds stout, almost equal or so, outer surface tubercular, rough; fingers blunt pointed. Leg joints narrow or broad, compressed upper edges except of dactylus crested or crenate or entire.

Key to the species of Orissa, *Demania*

1. Front horizontal, antero-lateral teeth acuminate *alcocki*
- Front angularly or slightly convex, antero-lateral teeth low, distinct 2
2. Entire carapace and chelipeds closely covered with sharp or blunt tubercles of small sizes dorsal creasts on leg joints serrated like saw 3
- Large, flat top, scale like tubercles, much more and very close on the chelae surface and on posterior third of dorsal surface of carapace 4
3. Carapace broadly oval, front only slightly convex, large rounded tubercles on posterior third of carapace *scaberrima* ,
- Carapace pentagonal, narrow, front conical in middle, surface tubercles small uniform sharp.. *reynaudii*
4. Very large size, almost smooth, convex regional lobules; surface of posterior part of carapace rough, large compact flat topped tubercles on chelae. Front conical medially *indiana*
- Large size, deep distinctly separated regional areole surfaces not smooth, larger tubercles on posterior third. Large tubercles on chelae less in number, not compact. Front with four dents *splendida*

Demina scaberrima (Walker)

Xantho scaberrimus walker 1887 : 115 (not seen)

Xantho (Lophoxanthus) scaberrimus, Alcock 1898 : 116 = *D. indiana* Deb 1986.

Demania scaberrima, Guinot 1969, *Cahiers du Pacific*, 13 : 237. Serene 1984, *Fauna Tropicale*, 24 : 42.

Material examined : one female.

Diagnosis : Broadly oval shape, medium in size, carapace and chelipeds covered with close

tubercles, almost uniform in size, sharp small on chelipeds. Front little convex. Antero-lateral teeth triangular law, well separated. Anterior edges of leg joints saw like serrated.

Distribution : Orissa coast, (first record) Mahanadi River mouth; Singapore, Japan to Hongkong.

Remarks : Recorded first time from India.

Status : Rare.

Demania indiana Deb

Demania indiana Deb, 1986, *Rec. zool. Surv. India*, 83 : 130.

Material examined : One male.

Diagnosis : Carapace convex, narrow, pentagonal. Front conical, bilaminar, edges of lamina oblique, concave. Eyes small. Antero-lateral sides indistinctly four lobed. Regional lobules separate and convex surface rough near the edges and posteriorly, almost smooth in middle. Chelipeds very stout, almost equal, outer surface closely covered with flat top large tubercles well separated by hairy grooves.

Distribution : Bay of Bengal coast of Orissa.

Remarks : Close to *D. goxica* Garth 1971, but for its flat topped scabrous surface tubercles, upper distal corner of merii of legs with a large conical tooth and apical end of anterior male pleopod spirally coiled, these are wanting in *D. toxica*.

Habitat : Rocky cervices.

Status : Rare.

Family POTAMIDAE Ortmann

Potamoninae, Ortmann 1896 : 445; Rathbun 1904 : 247 (not seen)

Potamonidae Alcock 1910, *Cat. Ind. Decap. Crust.*, 1 (2) : 16.

Potamidae Bott 1970, *Rev. Suisse (Zool.)*, 77 : 134.

Only fresh water crabs belongs to the family, some of these crabs are found in river mouth also, the species *Oziotelphusa hydrodroma* a common peninsular Indian crab.

Genus *Paratelphusa* Bott

Paratelphusa (Oziotelphusa) hydrodroma (Herbst)

Spiralothelphusa hydrodroma (Herbst), Bott

Cancer hydrodromus Herbst, 1794, *Naturgesch. Kra. Krebse*, 2 : 164.

Paratelphusa (Oziotelphusa) hydrodroma, Alcock 1910 : 97.

Spiralotelphusa hydrodroma Bott 1970, *Abh. Senckene. Nodurf. Ges. no.* 526 : 97.

Material examined : 2 exs.

Diagnosis : Carapace smooth, strongly convex before backwards; length 2/3 to 3/4 of width of crab; cervical groove distinct, ends behind post orbital crests, at a point in line with orbital tooth. Regions distinct Front 1/3 width of crab, orbits broad, outer angle blunt. Antero-lateral sides crest like, smooth in adult. Chelipeds unequal, smooth, fingers longer than narrow palm, finger tips pointed.

Distribution : Mahanadi river in Orissa, West Bengal, Bihar, U.P., Rajasthan, Peninsular India; Sri Lanka and Tranquebar.

Remarks : Smooth, medium, olivegreen crab, sharp epigastric crests slightly in advance of Post orbital crests.

Family OCYPODIDAE Ortmann

Ocypodidae Ortmann 1894 : 700 (not seen); Alcock 1900, *J. Asia. Soc. Bengal*, 69:283, Sakai 1939 : 367; 1976:597.

Estuarine crabs, amphibious, burrowing in sandy beach, littoral, lives commonly in groups. Front narrow, curved downward, orbits deep, large, long, occupy whole anterior border outside front, outer wall wanting. Buccal cavity large, narrower in front than behind, completely closed by maxillipeds, Male abdomen narrow.

Deep, square or little broad, four sided crab. Chelipeds remarkably unequal in male and in both sexes.

Key to the genus of *Ocypodidae*

1. Carapace square, deep, dorsal surface close, uniformly granular, size large adults more than 10 mm in width. Chelipeds unequal remarkably in both sexes. Regions not defined *Ocypode*
- Carapace deep, smooth, much broader than long, medium in size or small, 10 mm or less in width grooved dorsal surface and lateral sides or broadly quadrilateral, flatish, regions outlined, covered with short hairs and granules 2
2. Chelipeds of male markedly unequal, carapace smooth, regions not defined, much broadened anteriorly, Eye stalks long, slender
- Chelipeds slightly unequal or equal, small, subcubical, crab, flat, depressed, well defined regions. Chelae equal or almost so in male, much slender, equal in female 3
3. Flatish crab, regions well marked, teeth on antero-lateral sides of carapace .. *Macrophthalmus*
- Small, subcubical crab, grooved dorsum and side walls and merus of external maxillipeds, equal chelae *Dotilla*

Genus *Dotilla* Stimpson

Dotilla Stimpson 1858, *Proc. Ac. Nat. Sci. Philad* : 98 Alcock 1900, 69 : 363.

Very small cubic crabs, (5 mm – 10 mm) wide, front narrow, bent downwards. Eye stalks long,

slender, eyes terminal. Buccal cavity large, covered by bulge maxillipeds. Chelipeds equal, stouter than legs, fingers narrow, Present only one species.

***Dotilla brevitarsis* de Man**

Dotilla brevitarsis, de Man, *J. Linn. Soc. Zool.* XXII. 1887-88 : 130.

Dotilla brevitarsis Alcock, 1900, **69** : 367.

Material seen : One ex.

Diagnosis : Whole carapace i.e. dorsal surface, side walls, maxillipeds grooved. Chelipeds stout, no spine on arm, palm narrow compressed, a high fine raised line parallel to lower border present. Fingers thin, upper edge of palm and fingers hairy. Merii of legs very broad, all have tympanum, that are absent on sternum.

Distribution : Mahanadi river mouth, Chendipur, Bay of Bengal coast of West Bengal, Orissa, India and Mergui.

Remarks : Small size and quick runner, hide in burrows on sandy beaches, lives in groups.

Habitat : Soft mud flats, sandy beaches.

Status : Fairly common.

Genus *Ocypode* Webber

Ocynode Weber 1795, *Nom. Ent. Syst.*, : 92 (not seen); Sakai 1976 : 598.

Ocypoda Latreille, 1803, *Hist. Nat. Const. ét. Ins.*, VI : 27 (not seen); Alcock 1900:343, Sakai 1939 : 611.

Deep, square, little convex, dorsal surface close uniformly granular, regions not defined. Front narrow, downward deflexed, eyes large, often tipped by prolonged styles. Chelipeds unequal, stout, in some cases, a stridulating organ present near the base of fingers of larger palm. Between the basal joints of 2nd and 3rd pair of legs thickly hairy pad present.

***Ocypode macrocera* Edw.**

Ocypoda macrocera H. Milne Edwards, 1834, *Hist. Nat. Crust. II* : 49 (not seen) Alcock, **69** : 347.

Material seen : 10 exs.

Diagnosis : Carapace square slightly convex, close uniformly granular, regions not defined. Large oblique orbits. Minute granules present on external maxillipeds. Hairs much less on stridulating ridge on inner surface of larger palm, Finger tips of smaller chela broad spatulate not pointed.

Distribution : Bay of Bengal coasts of India, also East and West Coasts.

Habitat : River mouth, coastal salt water.

Remarks : Broad lamellar finger tips of smaller chela gives correct specific identity.

Status : Common

Genus *Uca* Leach 1814

Uca Leach 1814, *Edin. Encyclo.*, 7 : 430 (not seen); Crane 1975 Fiddler Crabs of World:1-736; Sakai 1976:600. *Gelasimus* Latreille 1817, *Nouv. Dict. Hist. Nat.*, 12 : 517 (not seen) Alcock 1900, 69 : 350, Sakai 1939 : 615.

Deep, broad, sub quadrilateral crab, antero-lateral angles acute, lateral sides more or less convergent posteriorly. Front narrow, obliquely bent downwards.

Orbits narrow, cavities occupy whole anterior side except front. One chela enormous in adult male, other chela as in female, narrower and shorter than legs. Male abdomen narrow, seven jointed.

Distribution : Tropical Indo pacific common crab.

Habitat : Mud flats, coastal mangrove swamps, River mouths, creeks.

Remarks : Males use their larger chela for self protection and produce sound.

Status : Very common.

Key to the species of *Uca*

1. Front much less than 1/10 of the width of carapace, arm of large male chela ends in a small lobe *acutus*
- Front about 1/6th of the width of carapace, no small lobe on arm of large male chela, two granular oblique ridges on inner surface of large male chela 2
2. Hexagonal shape of crab, lateral side convergent behind strongly *triangularis*
- Subquadrilateral shape of crab, lateral sides moderately convergent behind or parallel 3
3. One large tooth near the tip of fixed finger of large chela of male look like a notch or truncate *anulipes*
- Tip of fixed finger not notched or truncate, lateral side of crab parallel or so *lacteas*

Uca triangularis (Edw.)

Gelasimus triangularis A Milne Edwards 1873; *Nour. Archiv. du. Mus.* IX:275 (not seen)

Uca triangularis Miyake 1963 *Rep. Comm. Foreign Sec. Res. Kyushu Univ.* (I) Japan : 70.

Uca (Celuca) triangularis triangularis Crane 1975:290; Sakai 1976:607.

Material seen : 1 ex.

Diagnosis : Strongly convex, length little more or less than half of width, which is at the spine like antero-lateral angles. Roughly hexagonal in shape, regions not defined. True posterior side less than half of the width of crab. Front 1/5 of width, oblique orbit with beaded upper and lower edges.

Outer surfaces of joints of larger chela of male smooth, their upper lower and inner borders of arm and palm serrate. Tip of dactylus hooked and hangs over the tip of fixed finger.

Distribution : Bay of Bengal Coasts of India; Philippines; Japan; New Guinea and New Caledonia.

Habitat : Mud flats of river mouth and Mangrove area.

Remarks : Very convex hexagonal shape, dotted purple colour, darker posteriorly.

Status : Common.

Uca annulipes (Edw.)

Gelasimus annulipes H. Milne Edwards 1837, *Hist. Nat. Crustacea* : 55; Alcock 1900:353; Sakai 1939:616.

Uca annulipes Sakai 1936 a : 170; Crosnier 165 : 117;

Uca (Celuca) lactea annulipes Sakai 1976 : 608.

Material examined : 6 exs.

Diagnosis : Carapace broad, length $\frac{3}{5}$ of width, antero-lateral angle claw like, sharp. True posterior side of crab without $\frac{1}{2}$ of maximum width of crab. Front $\frac{1}{6}$ of the width of crab. Outer surfaces of male larger chela smooth; inner surface of palm with two granular crests. Fingers of larger for chela widely gaping, tips close, tip of short fixed finger truncate-notched for one sub apical enlarge tooth.

Distribution : East West coasts of India; All parts of the coasts of Japan, China, Philippine, Mergui to Madagascar and East Coast of Africa.

Habitat : Mud-flats of all coasts of India.

Remarks : Antero-external corners claw like, sharp; lower edge of oblique orbit crenulate, wide front $\frac{1}{6}$ of crabs breadth.

Status : Common to abundant.

Uca lactea (De Haan)

Ocypode (Gelasimus) lactea De Haan 1835 : 54.

Gelasimus lacteus Alcock 1900 : 355.

Uca Lactea Ortmann 1897 : 355, Sakai 1935 : 212.

Uca (Celuca) lactea lactea Crane 1975 : 300; Sakai 1976 : 608.

Material examined : 2 exs.

Diagnosis : Quadrangular crab, lateral sides parallel, front $\frac{1}{5}$ th of width. Smooth outer surfaces of larger male chela, finger tips acute, tip of fixed finger never notched or truncate.

Distribution : Andaman, Bay of Bengal coasts of India; Karachi; Ranges from Japan to Formosa and Hongkong.

Habitat : Mud flats during low tide.

Remarks : Quadrangular shape, parallel lateral sides broad front helps in quick identification of species.

Status : Common.

***Uca acutus* stimpson**

Gelasimus acutus Stimpson 1858 : 99; Alcock 1900 : 361.

Uca (Deltuca) acutus Crane 1975 : 25.

Material seen : 3 exs.

Diagnosis : Narrow front, length of crab $\frac{3}{5}$ of maximum width which is at acute antero-external angles. Dorsal surface strongly convex, strongly convergent lateral sides. Both upper lower borders of oblique orbits crenulate. Outer surface of wrist and palm of larger chela of male covered with bubble like granules. Large subterminal tubercles of fingers; give forceps like grip to the fingers when closed. Merii of last pair of legs broad.

Distribution : Andamans, Mergui, Bay of Bengal coasts of India and Karachi.

Habitat : Mud flats.

Remarks : Narrow front, strongly convergent lateral sides bubble like granules on outer surface of palm and wrist of larger chela helps to locate the species.

Status : Very common.

Genus *Macrophthalmus* Latreille

Macrophthalmus Latreille 1829. *Cuviers Regne Aned 2 - Vol. 4* : 44 (not seen) : Alcock 1900 : 375; Sakai 1976 : 609.

Aquadilateral flat, depressed crab, much broader than long, cervical and branchial grooves well defined. Front narrow, orbits narrow long trenches, eye stalks long. Chelae long, stout, equal or sub equal in male and slender, equal in female.

***Macrophthalmus depressus* Ruppell**

Macrophthalmus depressus Ruppell, 24 *Krabben Roth. Meer* : 19 (Not seen) Alcock 1900 : 380.

Material seen : 6 exs.

Diagnosis : Carapace broader than long, depressed, lateral sided parallel, antero-lateral angle square cut like a lobe. Surface granules may or may not be visible, on epibrnchial regions two finely granular obliquely longitudinal lines present. Front narrow, $\frac{1}{8}$ of crabs width, free edge entire. Both upper and lower orbital edges granular. Inner surfaces of chela joints and upper surfaces of leg joints densely hairy. One large tooth on basal end of dactylus and a similar oblique tooth on the fixed finger present.

Distribution : East coasts of India; Mergui; Aden.

Habitat : Mud flats, soft mud bottoms.

Remarks : Mud Colour, depressed square shaped crab.

Status : Common.

Family GRAPSIDAE Dana

Grapsidae Dana, 1851; *Amer. J. Sci.* (2) 12 : 287 (not seen); Alcock 1900:283; Sakai 1939; 1976-627;

Carapace usually quadrilateral, with lateral sides straight or little arched, orbits on antero-external angles. Buccal cavity square, large rhomboidal gap present between the external maxillipeds. Front broad.

Habitat : Rock, drift, weed and timber hunting, pelagic.

Key to the genera of family GRAPSIDAE.

1. No oblique hairy ridge on exposed surface of external maxilliped 2
- An oblique hairy ridge on exposed surfaces of external maxillipeds 4
2. Depressed crab, lateral sides arched, front less than half of width of crab 3
- Thick, square crab, front more than half of width of crab *Metopograpsus*
3. Terminal leg joints broad, thin compressed, finger tips not spooned *Varuna*
- Terminal leg joints broad, compressed not thin, Fingers with broad spooned tips *Grapsus*
4. Carapace nearly square thick, smooth or partly hairy *Sesarma*
- Carapace thin, depressed, sub circular or quadrilateral, much broader than long 5
5. Subcircular carapace covered with tubercles *Plagusia*
- Quadrilateral Crab, regions defined by grooves *Metaplax*

Genus *Grapsus* Lamarck

Grapsus Lamarck, 1801, *Syst. Anim. Sans. Vertebr* : 150; Alcock 1900 : 390; Sakai 1939 : 646; 1976 : 629;

Carapace flatish disc like lateral sides curved, with a tooth behind the acute outer orbital angle. Front about 1/2 of width, curved downwards, four tubercles on upper edge. Cheliped subequal; leg joints broad, compressed mainly the merii, dactylus thorny.

Distributed considerably in rocks and reefs of tropical Indo Pacific seas, amphibious in habit; Active, quick and cunning in nature.

***Grapsus albolineatus* (Lamarck)**

Cancer strogosus Berbst 1799 : 55 (not seen)

Grapsus albo-lineatus Lamarck 1818, *Hist. Nat. Anim. Sans Vert.*, 5 : 249.

Grapsus strigosus, Alcock 1900 : 393.

Grapsus albolineatus, Sakai 1976 : 630.

Diagnosis : Carapace disk like, thin regions faintly defined, oblique ridges on sides low, smooth and inter spaces between ridges quite smooth. Free frontal edge not crenulate. Finger tips of chelae not much broad and blunt.

Distribution : East West coasts of India, From Japan, Hawaii to Australia, Red Sea and East Coast of Africa.

Habitat : Amphibious, above tidal mark, coral reef, Rocky beach etc.

Remarks : Very near to *G. grapsus* except deeply defined regions and reticulate surface sculpture between lateral oblique ridges.

Status : Very common in Andaman Nicobars, West Coast of India than in East Coast; Sri Lanka; Laccadives areas and Pakistan.

Genus *Metopograpsus* H. Milne Edwards

Metopograpsus H. Milne Edwards 1853, *Ann. Sci. Nat.* (3), 20 : 164; Alcock 1900 : 396; Sakai 1939:653; 1976:633.

Carapace quadrate, little broader than long, dorsal surface flatish or slightly convex, regions not defined, only the arched branchial groove distinctly defined, dorso lateral sides marked obliquely. Front 3/5 of width of crab, free frontal edge beaded, thin and prominent. Chelae unequal; leg joints compressed, hairy, dactylus thorny. Indo Pacific.

***Metopograpsus messor* (Forsk)**

Cancer messor Forskal 1775, *Anim. in itin. Orient* : 88 (not seen)

Grapsus messor H. Milne Edwards 1837, *Hist. Natu. Crust. Paris*, 2 : 88.

Metopograpsus messor, Alcock 1900 : 397; Sakai 1939 : 654; 1976 : 633.

Diagnosis : Lateral sides of thick crab slightly convergent posteriorly. Front 3/5 of the width of Crab, free edge beaded; oblique orbits, its inner lower edge dentate. Chelae unequal, finger tips blunt. Upper distal edge of merii of legs ends in a spine, its lower distal edge spinate.

Distribution : All the coasts of India; Pakistan, widely ranges from Japan, Hawaii to Red Sea; Arabian Sea and East Coast of Africa.

Habitat : Rocks, reefs above high tidal mark.

Remarks : Free frontal edge beaded, slightly concave in middle mainly distinguishes *M. messor* from *M. maculatus* the other known Indian species.

Status : Common.

Genus *Metaplax* H. Milne Edw.

Metaplax H. Milne Edwards, 1853, *Ann. Sci. Nat.* (3) 18 : 161; Alcock 1900:430; Sakai 1939:698:1976:673.

Quadrilateral : flat, thin crab, broader than long, regions fairly marked; branchial, cervical grooves distinct. Front 1/3-1/4 of carapace. Lateral sides of Crab 4-5 dentate, last 1 or 2 dents small. Chelipeds longer and stouter than legs in male, shorter and slenderer in female. Commonly seen, Mud flats, Estuaries.

Key to the species of *Metaplax*

1. Anterior edges of carpi and propodites of legs spinate in adult *crenulata*
- Anterior edges of carpi and Propodities of legs not spinate *indica*

Metaplax indica H. M. Edw.

Metaplax indicus H. Milne Edwards 1852, *Ann. Sci. Nat. Zool* (3) 18 : 161 : Alcock 1900 : 432.

Material : 2 exs.

Diagnosis : Two third as long wide crab, slightly convex dorsally, surface smooth, regions defined faintly. Straight lateral sides of crab 4 dentate, last two dents minute. Lower orbital edge crenulate. Male chelae equal, stout, apparently smooth, arm long, slender with a musical creast on inner edge, palm twice as long as high, fingers without large lobe on dentry edge. Carpus and propodus of middle pair of legs hairy, 3rd, 4th and 5th male abdominal joints fused together.

Distribution : East and West Coasts of India.

Habitat : Mud flats.

; **Remarks** : Smooth surface, 4 lateral teeth.

Status : Common.

Metaplax crenulata Gerst

Rachonotus crenulatus Gerstaecker, *Arch. F. Naturges.* 22, 1856 : 142.

Metaplax crenulata Alcock 1900 : 435.

Diagnosis : 3/4 as long as wide Crab, convex, regions well marked, grooves deep, surface pitted, Front about 4-5 of width of crab, lateral sides of crab curved, five dentate, edges of dents serrate. Lower outer orbital edge beaded. Chelae of male stout long, edges of wrist, hand sharply granular, arm long slender with musical crest on inner border. Dentry edges of fingers without lobes. Both edges of merii and anterior edges of last 3 joints of legs apinulate in adults. Male abdominal joints not fused.

Distribution : Sundarbans, Orissa Coast of Bay of Bengal and Mergui.

Habitat : Mud flats.

Remarks : Not a squarish Crab, rather rounded, leg joints in adult spinate.

Status Rare.

Genus *Sesarma* Say

Sesarma Say 1817, *J. Philadelphia Acad. Nat. Sci.*, 1 : 76; Alcock 1900:409; Sakai 1939:679; 1976:654.

Diagnosis : Deep brown cubic crab, dorsal surface seldom very convex, four post frontal tubercles and gastric region always well defined, other four-five sub regions just defined. Side walls of crab uniformly reticulate hairy. Front 1/2 or more of anterior side, curved downward vertically or obliquely. Buccal cavity square, a large rhomboidal gap fringed with hairs between the maxillipeds, which are traversed by an oblique crest of hairs. Chelipeds subequal stout; palm short and high, finger tips subacute and hollowed. Merii of legs broad compressed. Male abdomen 7 separate jointed.

Chelipeds subequal stout; palm short and high, finger tips subacute and hollowed, Merii of legs broad compressed. Male abdomen 7 separate jointed.

Distributed in all tropical and subtropical seas, absent in Mediterranean.

Key to the Species of *Sesarma*

1. Upper edge of palm of male with two oblique comb like ridges; upper edge of moveable finger of male milled. Distal end of inner edge of arm like a large acute tooth 2
- Upper edge of palm of male is finely pectinated straight ridge. Inner surface of palm with a transverse granular ridge airy, large (40 mm wide) crab 3
2. No tooth on sides behind orbital angles *plicata*
- Only one tooth on sides behind orbital angles *bidens*
3. Upper edge of moveable finger of male with 40-60 fine, milled lamellae *mederi*
- Upper edge of moveable finger of male with 10 beads or crenules *tetragonum*

Sesarma (Parasesarma) plicatum (Latreille)

Ocypoda plicata Latreille 1806, *Hist. Nat. Crust.*, 6 : 47 (not seen)

Sesarma quadrata H. Milne Edwards 1837:75; De Man 1887:683; Alcock 1900:413.

Sesarma (Parasesarma) plicata Tesch 1917 *Zool. Meded.* 3 : 187 : Sakai 1939 : 683.

Sesarma (Parasesarma) plicatum Sakai 1976 : 656.

Material seen : 2 exs.

Diagnosis : Dorsal surface flat or little arched, length of crab 4/5 of its maximum width. Four post frontal lobes equal, hairy, rugose horizontally. Regions fairly defined, epibranchial regions obliquely striated. Front more than half of width of crab, free edge weakly concave in middle. Lateral sides parallel or little convergent posteriorly. Chelae differ in male female, outer surfaces of arm, wrist and palm granular, inner edge of arm bear a large distal spine. Upper edge of dactylus milled with 11-19 lamellae. Merii of legs compressed, upper edge ends in a subdistal spine.

Distribution : East West Coasts of India, Andaman Nicobars; Sri Lanka; Korea; Japan; China; Malay Archipelago; Madagascar and East Coast of Africa.

Habitat : Muddy shores above high tidal mark, rocky beaches.

Remarks : Presence of a large acute spine on inner corner of arm of chela is distinctive for the species.

Status : Fairly common.

***Sesarma (Chiromantes) bidens* (De Haan)**

Grapsus (Pachysoma) bidens De Haan 1835 : 60.

Sesarma bidens, Dana 1852:353; Alcock 1900:415.

Sesarma (Chiromantes) bidens, Rathbun 1910a:309; Sakai 1939:688; 1976:658.

Material seen : 3 exs.

Diagnosis : Resembles *S (P) plicatum* (Latr.) but for the followings (1) presence of a sharp tooth behind outer orbital angle; (2) Tubercle like coarse beads on upper edge of dactylus of chela; (3) Slightly less transverse crab.

Distribution : Bay of Bengal coasts, Andaman Nicobars; Sri Lanka; Japan; Korea; Formosa; Hongkong and Malay Archipelago.

Habitat : Mud flats near river mouth, inland sea.

Status : Common.

***Sesarma (Neoepisesarma) mederi* (Edw)**

Sesarma taeniolatum White 1842, *List of crust. Brit. Mus.* 38; Alcock 1900 : 419.

Sesarma mederi A. Milne Edwards 1853; *Ann. Sci. Nat. Zool* (3) XX : 185.

Sesarma (Neoepisesarma) mederi, Serene and Soh 1970, *Treubia*, 27:387-416.

Material seen : 1 ex.

Diagnosis : Deep, square, cubic crab, length slightly less than width, 4 prominent post frontal tubercles, regions well marked, less convex dorsal surface covered with tufts of hair, longest anteriorly, oblique striae on sides. Front 1/2 or more of width of Crab, free edge concave. Parallel lateral sides with one acute tooth behind outer orbital angle. Stout equal similar chela, outer surface of palm granular, of arm and wrist rugose and granulose. 40-60 even tubercles or milled crest on upper edge of palm. Merii of legs ends with a sharp apine on anterior edge only.

Distribution : East coast of India; Andamans; Japan; Penang; Malay; Mergui and Sumatra.

Habitat : Mud flat in Mangrove swamp, Rive mouth.

Remarks : *Neoepisesarma* is characterised by the dorsally flat, quadrangular crab shape, regular even tubercles on dactylus of palm are more i.e. 40-120 in number, nature of male pleopods, presence of tympanum only on 4th adult male sternite.

Status : Fairly common.

Genus *Varuna* H. Milne Edwards

Varuna H. Milne Edwards 1830, *Dicr. Hist. Nat.*, 16:511; Alcock 1900:400; Sakai 1939:647; 1976:644.

Diagnosis : Flat, depressed sub-circular crab, with thin sharp edges. Regions defined. Front thin horizontal, 1/2 or more of width of Crab, three teeth on antero lateral arched sides, including outer orbital angle. Orbits small. Chelae equal, variable in size. Three terminal leg joints broad, compressed, modified for swimming. Male abdomen 7 separate jointed.

Indo pacific can adjust even in fresh waters.

Varuna litterata (Fabr.)

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

Varuna litterate H. Milne Edwards 1837; 95; Alcock 1900:401; Sakai 1939:665; 1976:644.

Material seen : 14 exs.

Flat dorsal surface pitted, 'H' like mark on the centre of Carapace, sharp thin edges of Crab finely beaded. A distinct elongate facet on postero-lateral side of Crab. Inner-surface of palm with few granules, outer side reticulate. Flattened leg joints like swimming paddles.

Distribution : From Japan to India; Madagascar and East coast of Africa.

Habitat : Seas, Rivers, tanks, estuarine.

Remarks : Most common and easily available edible species of India.

Status : Abundant.

Genus *Plagusia* Laterille

Plagusia Laterille 1806, *Gen. Crust. 1* : 33 (not seen); Alcock 900:436; Sakai 1939:701; 1976:675.

Sub circular crab, flat, covered usually with large flat tubercles which fringed anteriorly with thick uniform bristles or obsolete in the young ones. No true front; inter orbital space 1/3 of width of crab, deep widely cleft, hence vertically fold tubercles are visible dorsally. Orbits deep. Surfaces of Chelae and legs rugose, subequal chelae, stouter in male. Male abdomen triangular all 7 joints separate or 3rd, 4th and 5th fused.

Tropical Indo pacific extent of Mediterranean, the genus adhere to ships near water-line or on timber in open sea.

Plagusia depressa tuberculata Lamarck

Plagusia auberculate Lamarck 1818, *Hist. Nat. Anim. Sans. Vert.*, 5 : 247 (not seen)

Plagusia depressa squamosa Alcock 1900:437.

Plagusia depressa tuberculata Rathbun 1918:334, Sakai 1939:702; 1976:676.

Material seen : 1 ex.

Diagnosis : All the regions of Crab distinct, surface tubercular. Four teeth including outer orbital angle on antero-lateral sides, smaller backwards. Chelipeds in male stout, in female slender; fingers stout, tips rounded and hollowed out. Tubercles on upper surfaces of palm and dactylus are in long rows, those on lower part of palm are transverse. Merii of legs has one strong subterminal spine on anterior edge, other joints have long strip of thick bristles.

Distribution : Bay of Bengal; Arabian Sea East coast of Africa towards hawaii, Japan and Chile.

Habitat : Rocky beaches, attached to floating timbers.

Status : Fairly common.

SUMMARY

Present paper deals with crustaceas (Crabs and Prawns) of Mahanadi river mouth. Total fauna comprise of 226 exs. decomposed stomatopoda of 2 species; Prawns 98 exs belongs to two families, 12 species and Crabs of 44 species which include 128 exs of 8 families, belonging to 32 species. Only one species of poisonous Crab *Demania scaberrima* (walker) is a new record from India.

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MOLLUSCA

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INTRODUCTION

Subba Rao and Surya Rao (1985) reviewed the earlier studies on molluscs of Indian estuaries and provided a list of species recorded and an extensive bibliography. Later Ghosh (1992) gave a general account of estuarine ecosystem in India.

The earliest contribution to our knowledge of molluscan fauna of Mahanadi estuary, were made by Preston (1910) who reported *Martesia delicatula* and *Pandora parangusta* (= *Pandora brevifrons*) and Newton and Smith (1912) who reported *Crassostrea gryphoides* var. *cuttackensis*. Subsequently Subba Rao (1968) and Subba Rao and Mookherjee (1975) added 13 species of wood-boring molluscs and 21 species of other molluscs respectively. Later the species represented by dead shells from the Mahanadi estuary have also been incorporated in the Fauna of Orissa : Marine Molluscs by Subba Rao, Surya Rao and Maitra (1991) adding another 79 species. The recent collections studied in the present work include 33 species not reported earlier. Thus a total of 149 species known from the Mahanadi estuarine system are dealt with as listed below.

MATERIAL

The present studies are based on the collections received from the Estuarine Biological Station, Berhampur. Majority of the collections were hand picked includes empty shells of marine habitat carried into the estuary. The material includes a few cephalopods collected from the fishermen nets.

In order to make the report comprehensive all the species reported earlier are also included here. Details of species recorded earlier can be found in Fauna of Orissa by Subba Rao et. al (1991).

LIST OF MOLLUSCS FROM MAHANADI ESTUARY

Class GASTROPODA

1. Family PATELLIDAE

- *1. + *Cellana radiata radiata* (Born)

2. Family TROCHIDAE

2. *Umbonium vestiarium* (Linnaeus)

3. Family NERITIDAE

3. + *Nerita albicilla* Linnaeus
4. *Nerita articulata* Gould
5. + *Nerita chamaeleon* Linnaeus
6. + *Nerita squamulata* Le Guillou
7. *Neritina violacea* (Gmelin)
8. *Pseudonerita sulculosa* (von Martens)

4. Family LITTORINIDAE

9. *Littorina melanostoma* Gray
10. *Littorina scabra scabra* (Linnaeus)
11. *Littorina undulata* Gray
12. + *Nodilittorina pyramidalis pyramidalis* (Quoy & Gaimard)

5. Family IRAVADIIDAE

13. *Iravadia ornata* Blanford

6. Family ASSIMINEIDAE

14. *Assiminea theobaldiana* Nevill
15. *Assiminea woodmasoniana* Nevill

7. Family PLANAXIDAE

16. + *Planaxis nigra* Quoy & Gaimard

8. Family ARCHITECTONICIDAE

17. + *Architectonica laevigata* (Lamarck)

9. Family TURRITELLIDAE

18. + *Turritella acutangula* (Linnaeus)
19. + *Turritella columnaris* Kiener

10. Family POTAMIDIDAE.

20. *Cerithidea cingulata* (Gmelin)

- 21. *Cerithidea obtusa* (Lamarck)
- 22. *Telescopium telescopium* (Linnaeus)
- 23. *Terebralia palustris* (Linnaeus)

11. Family EPITONIIDAE

- 24. *Acrilla acuminata* (Sowerby)

12. Family CREPIDULIDAE

- 25. + *Calyptrea extincorium* Lamarck
- 26. + *Crepidula walschi* (Reeve)

13. Family XENOPHORIDAE

- *27. *Xenophora indica* (Gmelin)
- 28. + *Xenophora solaris* (Linnaeus)

14. Family NATICIDAE

- 29. + *Natica lineata* Roeding
- 30. *Natica tigrina* Roeding
- 31. + *Natica vitellus* (Linnaeus)
- 32. + *Polinices didyma* (Roeding)
- 33. + *Polinices tumidus* (Swainson)
- 34. + *Sinum delessertii* (Recluz)
- *35. + *Sinum neritoideum* (Linnaeus)

15. Family CASSIDAE

- 36. + *Phallium areola* (Linnaeus)
- 37. + *Phallium bisulcatum* Schubert & Wagner

16. Family TONNIDAE

- 38. + *Tonna dolium* (Linnaeus)

39. + *Tonna sulcosa* (Born)

17. Family FICIDAE

40. + *Ficus variegata* Roeding

18. Family CYMATIIDAE

- *41. + *Gyrineum natator* (Roeding)

19. Family BURSIDAE

42. + *Bursa rana* (Linnaeus)

- *43. + *Bursa spinosa* (Lamarck)

20. Family MURICIDAE

- *44. + *Cronia subnodulosa* (Melvill)

- *45. + *Mañcinella bufo* (Lamarck)

- *46. + *Murex carbonnieri* Jousseume

47. + *Murex trapa* Roeding

48. + *Rapana rapiformis* (Born)

49. *Thais lacera* (Born)

50. + *Thais tissoti* (Petit)

21. Family BUCCINIDAE

51. + *Babylonia spirata* (Linnaeus)

22. Family MELONGENIDAE

52. *Pugilina cochlidium* (Linnaeus)

23. Family NASSARIIDAE

53. + *Bullia vittata* (Linnaeus)

- *54. *Cyllene fuscata* A. Adams

55. + *Nassarius dorsatus* (Roeding)

56. *Nassarius stolatus* (Gmelin)

57. *Nassarius subconstrictus* (Sowerby)

24. Family OLIVIDAE

58. + *Agaronia nebulosa* (Lamarck)

59. + *Oliva oliva* (Linnaeus)

60. + *Olivancillaria gibbosa* (Born)

25. Family HARPIDAE

61. + *Harpa davidis* Roeding

26. Family TURRIDAE

62. + *Turricula javana* (Linnaeus)

63. + *Turricula tornata tornata* (Dillwyn)

27. Family TEREBRIDAE

64. + *Hastula bacillum* (Deshayes)

65. + *Hastula strigilata* (Linnaeus)

28. Family ELLOBIIDAE

66. *Ellobium gangeticum* (Pfeiffer)

67. *Pythia plicata* (Gray)

29. Family ONCHIDIIDAE

68. *Onchidium verruculatum* Cuvier

- *69. *Onchidium tenerum* Stoliczka

Class SCAPHOPHODA

30. Family DENTALLIDAE

70. *Dentalium octangulatum* Donovan

Class BIVALVIA

31. Family ARCIDAE

71. *Anadara granosa* (Linnaeus)

72. + *Anadara rhombea* (Born)

73. + *Scapharca deyrollei* Jousseaume

74. + *Scapharca inaequivalvis* (Bruguiere)

32. Family NOETIIDAE

75. + *Striarca lactea* (Linnaeus)

33. Family GLYCYMERIDIDAE

76. + *Glycymeris tenuicostatus* (Reeve)

34. Family MYTILIDAE

77. *Modiolus striatulus* (Hanley)

*78. *Perna viridis* (Linnaeus)

35. Family PECTINIDAE

79. + *Amusium pleuronectis* (Linnaeus)

80. + *Volachlamys tranquebaricus* (Gmelin)

36. Family ANOMIIDAE

*81. *Anomia* sp.

82. *Enigmonia aenigmatica* (Holten)

*83. *Placuna placenta* (Linnaeus)

37. Family OSTREIDAE

84. *Crassostrea cuttackensis* (Newton & Smith)

85. *Saccostrea cucullata* (Born)

38. Family CARDITIDAE

86. + *Cardites antiquata* (Linnaeus)

39. Family CARDIIDAE

87. + *Acanthocardia coronata* (Schroeter)

88. + *Trachycardium variegatum* (Sowerby)

40. Family MACTRIDAE

- 89. + *Mactra cuneata* Gmelin
- 90. + *Mactra grandis* Gmelin
- *91. *Mactra laevis* Chemnitz
- 92. + *Mactra luzonica* Deshayes
- 93. + *Mactra turgida* Gmelin
- *94. *Mactra violacea* Gmelin
- *95. *Spisula annandalei* (Preston)

41. Family SOLENIDAE

- *96. *Solen annandalei* Preston
- *97. *Solen kempfi* Preston

42. Family CULTELLIDAE

- 98. + *Siliqua radiata* (Linnaeus)

43. Family TELLINIDAE

- *99. *Apolymetis edentula* (Spengler)
- *100. *Macoma birmanica* (Philippi)
- 101. + *Macoma truncata* (Jonas)
- 102. + *Tellina rostrata* Linnaeus
- *103. *Tellina sinuata* spengler

44. Family DONACIDAE

- 104. + *Donax scortum* (Linnaeus)

45. Family PSAMMOBIIDAE

- 105. + *Gari maculosa* (Lamarck)
- *106. *Sanguinolaria acuminata* Deshayes

46. Family CORBICULIDAE

- 107. *Polymesoda bengalensis* (Lamarck)

47. Family VENERIDAE

- 108. + *Batissa calophylla* (Philippi)
- 109. + *Dosinia tumida* (Gray)
- 110. *Marcia pinguis* (Schroeter)
- *111. *Marcia recens* (Dillwyn)
- 112. *Meretrix casta* (Gmelin)
- 113. *Meretrix meretrix* (Linnaeus)
- 114. *Paphia malabarica* (Schroeter)
- 115. + *Paphia textrix* (Schroeter)
- *116. + *Paphia undulata* (Born)
- 117. + *Pelecypora exisa* (Schroeter)
- *118. *Pelecypora trigona* (Reeve)
- *119. + *Ruditapes bruguiera* (Hanley)
- 120. + *Sunetta donacina* (Gmelin)
- 121. + *Sunetta effosa* (Hanley)
- 122. + *Sunetta meroe* (Linnaeus)
- 123. + *Sunetta scripta* (Linnaeus)
- 124. + *Timoclea arakana* G & H. Nevill
- 125. + *Timoclea imbricata* (Sowerby)

48. Family GLAUCONOMIIDAE

- *126. *Glaucanome sculpta* (Sowerby)

49. Family CORBULIDAE

- 127. *Corbula rotalis* Hinds

50. Family PHOLADIDAE

- *128. *Barnea candida* (Linnaeus)

- 129. *Martesia delicatula* Preston
- 130. *Martesia striata* (Linnaeus)
- *131. *Pholas orientalis* (Linnaeus)

51. Family TEREDINIDAE

- 132. *Bactronophorus thoracites* (Gould)
- 133. *Bankia campanellata* Moll & Roch
- 134. *Bankia carinata* (Gray)
- 135. *Bankia fimbriata* Moll & Roch
- 136. *Bankia rochi* Moll
- 137. *Dicaythifer manni* Wright
- 138. *Lyrodus pedicillatus* (Quatrefages)
- 139. *Nausitora dunlopei* Wright
- 140. *Nausitora fusticula* (Jeffreys)
- 141. *Nausitora hedleyi* Schepman
- 142. *Nototerodo knoxi* (Bartsch)
- 143. *Teredora princisae* (Sivicks)

52. Family PANDORIDAE

- 144. + *Pandora brevifrons* Sowerby

53. Family LATERNULIDAE

- *145. *Laternula navicula* (Reeve)
- 146. *Laternula* sp.

Class CEPHALOPODA

54. Family SEPIIDAE

- 147. *Sepia inermis* (Ferussac et d' Orbigny)

55. Family LOLIGINIIDAE

148. *Loligo duvauceli* d' Orbigny149. *Loliolus investigatoris* Goodrich

[* New record from Mahanadi estuary ; + represented by empty shells/valves]

SYSTEMATIC ACCOUNT

Class GASTROPODA

Order ARCHAEOGASTROPODA

Family PATELLIDAE

1. *Cellana radiata radiata* (Born, 1778)*Recorded localities* : Mouth of Mahanadi near Paradip.*Remarks* : It is a marine species, occurs on rocks and boulders along the coast. A highly variable species. Only empty shells are found washed into the estuary.

Family TROCHIDAE

2. *Umbonium vestiarium* (Linnaeus, 1758)*Recorded localities* : Mouth of Mahanadi near Paradip, Gangolia near Paradip, K. G. Madeli, Lion's Rumph.*Remarks* : This species found to occur in the shallow sandy beaches near the river mouth, along the coast. A polymorphic species.

Family NERITIDAE

3. *Nerita (Amphinerita) articulata* Gould, 1847*Recorded localities* : Hukitola.*Remarks* : Estuarine in its habitat, usually occurs in the mangrove vegetation, found in the crevisis and branches of the mangrove plants upto highwater mark. It was recorded earlier under *Nerita articulata* from Hukitola (Subba Rao and Mookherjee, 1975).4. *Nerita (Theliostyla) albicilla* Linnaeus, 1758*Recorded localities* : Paradip.*Remarks* : This species occurs in marine waters, found attached to rocks and boulders and its crevisis. Only empty shells collected near Paradip (Subba Rao et al., 1991)

5. *Nerita (Theliostyla) chamaeleon* Linnaeus, 1758

Recorded localities : Mouth of Mahanadi near Paradip

Remarks : Marine in their habitat, found on the rocky shore. Only empty shells on the rocks near Paradip Port area in the open sea are collected.

6. *Nerita (Theliostyla) squamulata* Le Guillou, 1841

Recorded localities : Paradip

Remarks : It is also marine in its habitat, found on rocky shores along with preceding species and very closely resembles except in having scaly sculpture and depressed spire.

7. *Neritina (Dostia) violacea* (Gmelin, 1791)

Recorded localities :- K. G. Madeli, Paradip.

Remarks : It is estuarine in its habitat found attached to mangrove vegetation and other substratums in the river mouths and brackish water areas.

8. *Pseudonerita sulculosa* (von Martens, 1879).

Recorded localities : K. G. Madeli, Lion's Rumph, False Point and Paradip.

Remarks : An estuarine species, occurs in the surface of the wood, inside the bark, sometimes found in the empty tunnels of the shipworms.

Order MESOGASTROPODA

Family LITTORINIDAE

9. *Littorina (Littoraria) undulata* Gay, 1839

Recorded localities : Hukitola, Paradip.

Remarks : It usually occurs attached to rocks in the intertidal region in clusters during day time and active in during night. No fresh collections are studied recently.

10. *Littorina (Littorinopsis) scabra scabra* (Linnaeus, 1758)

Recorded localities : Hukitola, Lion's Rumph, Paradip.

Remarks : An intertidal species inhabits in the rock crevices on the shore and even occupies above the splash zone in the supralittoral zone. No fresh collection are studied.

11. *Littorina (Littorinopsis) melanostoma* Gray, 1839

Recorded localities : K. G. Madeli, Hukitola.

Remarks : A truly estuarine species, found clinging to the branches of mangrove vegetation, in the estuaries. No fresh collections are studied.

12. *Nodilittorina (Nodilittorina) pyramidalis pyramidalis* (Quoy and Gaimard, 1833)

Recorded localities : Paradip.

Remarks : Marine in its habitat, usually found in the crevices of the rocks and boulders in the rocky shores of intertidal region. The present record made from the rocks in the open sea near Paradip Port.

Family IRAVADIIDAE

13. *Iravadia ornata* Blanford, 1867

Recorded localities : False point.

Remarks : This species occurs in estuarine habitat, found attached to the undersurface of the stones in the creeks.

Family ASSIMINEIDAE

14. *Assiminea theobaldiana* Nevill, 1880

Recorded localities : K. G. Madeli.

Remarks : An estuarine species, prefers soft muddy areas in the river mouths. Very common in the Sunderbans.

15. *Assiminea woodmasoniana* Nevill, 1880

Recorded localities : K. G. Madeli

Remarks : This species inhabit in the estuaries, especially in the mangrove areas where the soil is muddy. Earlier it was recorded from Sunderbans in West Bengal and Andamans. Out of 6 species recorded in India, two species are in the Mahanadi estuary. No fresh collections are studied.

Family PLANAXIDAE

16. *Planaxis nigra* Quoy and Gaimard, 1833

Recorded localities : Paradip.

Remarks : Generally found in the crevices and surface of the rocks and boulders in the intertidal zone along with littorinids. It is collected from the rocks near Port area, Paradip.

Family ARCHITECTONICIDAE

17. *Architectonica laevigata* (Lamarck, 1822)

Recorded localities : K. G. Madeli, Mouth of Mahanadi near Paradip.

Remarks : Truly marine in its habitat, found in sandy bottom of the sea in the intertidal region. Only empty shells washed into the estuary collected.

Family TURRITELLIDAE

18. *Turritella acutangula* Linnaeus, 1758

Recorded localities : K. G. Madeli, Lion's Rumph, Paradip

Remarks : It inhabits in marine waters, usually found buried in the sandy beaches in the intertidal zone. Empty shells occupied by the hermit crabs might have entered into the estuary or thrown out by the fishermen collected in the trawls.

19. *Turritella columnaris* Kiener, 1843-44

Recorded localities : K. G. Madeli.

Remarks : Similar to preceding species.

Family POTAMIDIDAE

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

Recorded localities : K. G. Madeli, Hukitola, Lion's Rumph, Paradip, Machergaon, vill., Sonadhoora vill. near Devi river mouth.

Remarks : Most common species found in the estuaries and backwaters, gregarious in their habitat, found in large groups in the mudflats. This species prefers muddy bed admixed with sand. Shells often found on the shore washed by the tidal waters.

21. *Cerithidea (Cerithedia) obtusa* (Lamarck, 1822)

Recorded localities : K. G. Madeli, False Point.

Remarks : Estuarine in their habitat. Prefers soft mud, but uncommon. Species found clinging to the branches of mangrove vegetation. Occurs in wet spots of the semidried mudflats and avoid water when put them in it (Subba Rao and Mookherjee, 1975).

22. *Telescopium (Telescopium) telescopium* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, False Point, Hukitola, Lion's Rumph Paradip.

Remarks : An estuarine species, found in muddy banks, preferably soft mud. During unfavourable conditions it burrows deep into the soil for long time. Shells of this species collected in large numbers for manufacture of lime and poultry feed in the Sunderban region.

23. *Terebralia palustris* (Linnaeus, 1758)

Recorded localities : K. G. Madeli.

Remarks : It is also an estuarine species, prefers mud flats especially loose soil like *Telescopium telescopium* but uncommon. It is used as food by local people (Smith, 1961).

Family EPITONIIDAE**24. *Acrilla acuminata* Sowerby, 1844**

Recorded localities : K. G. Madeli

Remarks : Truly marine in their habitat, prefers sandy beaches in the intertidal region. Only an empty shell washed into the estuary collected.

Family CREPIDULIDAE**25. *Calyptreaa extinctorium* Lamarck, 1836**

Recorded localities : K. G. Madeli.

Remarks : Marine in their habitat usually found attached to other shells as an epifauna. An empty shell found attached along with other gastropod collected in the area.

26. *Crepidula walshi* (Reeve, 1859)

Recorded localities : K. G. Madeli, Lion's Rumph.

Remarks : Similar to preceding species in their habitat. Usually called as 'Slipper shell'.

Family XENOPHORIDAE**27. *Xenophora solaris* (Linnaeus, 1758)**

Recorded localities : K. G. Madeli.

Remarks : Marine in their habitat, lives at the bottom of the sandy bed in the deeper areas of the littoral region, usually caught in the fishermen trawls and nets. Known as 'Carrier shells' because of the tendency to carry other shells attached around on its surface.

28. *Xenophora indica* (Gmelin, 1791)

Recorded localities : Mangrove forest near Paradip.

Remarks : Similar to the preceding species in their habitat, but it differs from the preceding species in not having hollow spines around its margin. It is recorded for the first time from the estuary, earlier it is recorded from Puri by (Subba Rao et al, 1991).

Family NATICIDAE

29. *Natica (Natica) lineata* (Roeding, 1798)

Recorded localities : K. G. Madeli, Mangrove Forest near Paradip.

Remarks : This species prefers sandy bed admixed with mud in the intertidal region near the river mouths. Shell white with fine light brown oblique lines on its surface. Most of the shells are inhabited by hermit crabs.

30. *Natica (Natica) tigrina* (Roeding, 1798)

Recorded localities : Lion's Rumph, Mouth of Mahanadi, Paradip, Hukitola.

Remarks : Similar to preceding species in their habitat but more common. The surface is covered with purple brown spots arranged in spiral lines.

31. *Natica (Natica) vitellus* (Linnaeus, 1758)

Recorded localities : K. G. Madeli.

Remarks : Shells of this species are inhabited in sandy beaches in the intertidal area along the shore. Prefers marine habitat, However empty shells are being entered into the estuary by tidal waters. Usually caught in the fishermen nets. Shell larger than preceding species, surface covered with broad pale band on its body.

32. *Polinices (Glassaulax) didyma* (Roeding, 1798)

Recorded localities : Lion's Rumph, K. G. Madeli, Mangrove forest near Paradip.

Remarks : Marine in their habitat, prefers sandy beds. However, empty shells found carried into the estuary.

33. *Polinices (Polinices) tumidus* (Swainson, 1840)

Recorded localities : Lion's Rumph; K. G. Madeli, Mahanadi river mouth near Paradip.

Remarks : marine in their habitat same as preceding species. Empty shells are found carried deep into the estuary.

34. *Sinum delessertii* (Linnaeus, 1758)

Recorded localities : False Point.

Remarks : This species is also marine in their habitat same as preceding species. However, empty shells are found in the estuary.

35. *Sinum neritoideum* (Linnaeus, 1758)

Recorded localities : Mouth of Mahanadi near Paradip. It is recorded for the first time in the estuary.

Remarks : Similar to the preceding species is its habitat. No live animals collected in the locality. Only empty shells have been washed into the estuary.

Family CASSIDAE

36. *Phalium (Phalium) areola* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, Mahanadi river mouth near light house, Paradip.

Remarks : Marine in their habitat. Animals prefers sandy bottom of the sea. However, empty shells are washed into the estuary either by tidal waters or carried by the hermit crabs.

37. *Phalium (Semicassis) bisulcatum* (Schubert and Wagner, 1829)

Recorded localities : Lion's Rumph.

Remarks : Same as preceding species.

Family TONNIDAE

38. *Tonna dolium* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, Lion's Rumph.

Remarks : Species of this family prefers sandy bottom in the littoral zone along the coast. One of the commonest species in India. Shells very large, globose, with rounded ribs, ornamented by brown spots on it. Usually caught in fishermen's nets.

39. *Tonna sulcosa* (Born, 1778)

Recorded localities : K. G. Madeli, Lion's Rumph.

Remarks : Similar to preceding species in their habitat, but less common.

Family FICIDAE

40. *Ficus variegata* Roeding, 1798

Recorded localities : K. G. Madeli, Lion's Rumph, Mouth of Mahanadi near Light House, Paradip.

Remarks : An off shore species, prefers sandy bottom in the sea. Usually caught in the fishing trawls. Empty shells thrown out by fishermen might have been washed into the estuary.

Family CYMATIIDAE

41. *Gyrineum natator* (Roeding, 1798)

Recorded localities : Mahanadi river mouth, Paradip. It is recorded for the first time from the estuary.

Remarks : Empty shells found inhabited by hermit crabs collected in the area. This species is marine in their habitat, prefers rocky shores, found in under surface of the stones and boulders and their crevices.

Family BURSIDAE

42. *Bursa spinosa* (Lamarck)

Recorded localities : Mahanadi river mouth area.

Remarks : This species lives in deeper waters in the sea, prefers sandy bottom. Usually caught in the fishermen nets. However, emptyshells are carried into the estuary by the tidal waters or hermit crabs. It is recorded for the first time in the estuary.

43. *Bursa rana* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, Lion's Rumph, Mangrove forest Paradip.

Remarks : Similar to preceeding species. Only empty shells are found in the area.

Order NEOGASTROPODA

Family MURICIDAE

44. *Murex carbonnieri* (Jousseaume, 1881)

Recorded localities : This species occurs in sandy bed of the sea in the sublittoral zone, usually caught in the fishermen nets and thrownout on the shore by them. Empty shells often being carried into the estuary. It is recorded for the first time in the estuary.

45. *Murex trapa* Roeding, 1798

Recorded localities : Lion's Rumph.

Remarks : Similar to the preceeding species. Only empty shells carried into the estuary were found in the area.

46. *Cronia subnodulosa* (Melvill, 1893)

Recorded localities : Creek near Paradip. Mahanadi river mouth.

Remarks : This species is marine in their habitat, usually found in the crevisis of rocks on the shore. An empty shell might have been washed in the area.

47. *Thais lacera* (Born, 1778)

Recorded localities : K. G. Madeli, Lion's Rumph, Hukitola.

Remarks : This is the only species of the genus found to occur in estuarine habitat. Usually attached to the stones, pebbles, jetty piles etc. in the river mouths. Also found in brackish waters

like Chilka, Pulicat lakes. It was recorded earlier under the name *Cymia carinifera*. A variable species. *Cuma disjuncta* var. *obliterata* described from Barkuda island in Chilka Lake belongs to the present species.

48. *Thais tissoti* Petit, 1852

Recorded localities : Mahanadi river mouth Paradip.

Remarks : Marine species found attached to the rocks on the shore. Empty shells have been washed into the estuary. Earlier it was recorded from Paradip coast by Subba Rao et al, 1991 are of juvenile forms in which sculpture was not well developed.

49. *Mancinella bufo* Lamarck, 1822

Recorded localities : Mahanadi river mouth near Paradip, Gangolia near Paradip.

Remarks : It is a marine species, occurs among rock crevices on the shore. Since some rocks are occur in the open sea near Paradip port area, empty shells have been washed into the estuary.

50. *Rapana rapiformis* (Born, 1778)

Recorded localities : K. G. Madeli, Lion's Rumph.

Remarks : An inshore species found in deep waters on the sea bottom. Generally caught in the fishermen nets and thrownout on the shore. Empty shells are washed into the estuary.

Family BUCCINIDAE

51. *Babylonia spirata* Linnaeus, 1758

Recorded localities : Marine in the habitat, this species occurs in sandy beaches on the intertidal zone and beyond empty shells thrownout are occupied by hermit crabs often find its way into the estuary.

Family MELONGENIDAE

52. *Pugilina cochlidium* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, Hukitola. Mahanadi mouth area near Paradip.

Remarks : An estuarine species, occurs in soft mud in the river mouth and back waters. Common species occurs throughout Indian coast including Andamans. Large number of these shells

are caught by fishermen and after cleaning, they are being sold in the market by making designs on its surface.

Family NASSARIIDAE

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

Recorded localities : K. G. Madeli, Hukitola. Gangolia near Paradip.

Remarks : This species prefers sandy beaches admixed with mud, commonly occurs near the river mouths in the intertidal zone. Empty shells are found their way into the estuaries carried by hermit crabs.

54. *Nassarius (Aciculina) subconstrictus* Sowerby, 1899

Recorded localities : This species prefers backwaters and muddy banks near estuaries. Smaller in their size than the preceding species. It is recorded earlier from Chilka Lake and Ennur backwaters in the east coast. Empty shells entered into the estuary near Lion's Rumph.

55. *Nassarius (Zeuxis) dorsatus* (Roeding, 1798)

Recorded localities : Lion's Rumph.

Remarks : Marine in its habitat, prefers sandy bed in the intertidal area.

56. *Bullia (Dorsanum) vittata* (Linnaeus, 1758)

Recorded localities : K. G. Madeli.

Remarks : Marine in its habitat, occurs in the sandy bed in the intertidal zone, buried under subsurface level, can be seen during retreating waters on the coast.

57. *Cyllene (Cyllene) fuscata* A. Adams, 1850

Recorded localities : Near mangrove forest, Hukitola.

Remarks : This species occurs in sandy beaches in the intertidal zone. However, empty shells have entered into the estuary by tidal waters.

Family OLIVIDAE

58. *Oliva oliva* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, Hukitola.

Remarks : Truly marine in its habitat, prefers sandy beaches in the intertidal zone. However, empty shells find its way into the estuary.

59. *Olivancillaria gibbosa* (Born, 1778)

Recorded localities : Lion's Rumph, Gangolia near Paradip, Mahanadi river mouth near Paradip.

Remarks : Similar to the preceding species in their habitat. Empty shells have been found in the area.

60. *Agaronia nebulosa* (Lamarck, 1845)

Recorded localities : Lion's Rumph.

Remarks : Same as preceding species.

Family HARPIDAE

61. *Harpa davidis* Roeding, 1798

Recorded localities : K. G. Madeli.

Remarks : Marine species, does not occur in the estuaries. Only empty shells were collected in the area.

Family TURRIDAE

62. *Turricula tornata tornata* (Dillwyn, 1791)

Recorded localities : Creek near Mahanadi river mouth.

Remarks : Marine species, inhabits in the sublittoral zone, prefers sandy bed. Only empty shell inhabited by hermit crab finds its way into the estuary. There is no earlier record from Mahanadi.

63. *Turricula javana* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, Lion's Rumph.

Remarks : Similar to the preceding species.

Family TEREBRIDAE

64. *Hastula bacillum* (Deshayes)

Recorded localities : K. G. Madeli.

Remarks : Marine in their habitat. Occurs buried in the subsurface level in the sandy beaches along the coast. Only empty shells finds its way into the estuary.

65. *Hastula strigillata* (Linnaeus, 1758)

Recorded localities : K. G. Madeli.

Remarks : Similar to the preceding species.

Subclass PULMONATA

Order BASOMMATOPHORA

Family ELLOBIIDAE

66. *Ellobium (Auricularia) gangeticum* Pfeiffer

Recorded localities : K. G. Madeli, False Point.

Remarks : These animals prefers salt marshes and mangrove swamps, estuaries and mud flats, even occur in the places where little moisture is present in the dry areas near the vicinity of the sea. Collections are made earlier from the areas in live condition.

67. *Pythia plicata* (Gray, 1825)

Recorded localities : Lion's Rumph, False Point and Paradip.

Remarks : Similar to the preceding species.

Order SOLEOLIFERA

Family ONCHIDIDAE

68. *Onchidium verruculatum* Cuvier, 1830

Recorded localities : Different localities in the estuary.

Remarks : This species though prefers marine habitat, usually found to occur in the shallow beaches in rocky shore, found attached to rocks, tree trunks at supralittoral zone of marine habitat. However, they occur in brackishwater mudflats.

69. *Onchidium tenerum* Stoliczka, 1869

Recorded localities : Creek near Mahanadi river mouth Paradip.

Remarks : This species inhabits in mudflats in the estuaries. It was recorded earlier from Gangetic delta and Hooghly-Matlah estuary in West Bengal. It is recorded for the first time from the Mahanadi estuary. Thus extends its distribution further south.

Class SCAPHOPODA

Order DENTALIODA

Family DENTALIIDAE

70. *Dentalium octangulatum* Donovan, 1804

Recorded localities : K. G. Madeli, Lion's Rumph.

Remarks : Marine in its habitat, occurs half buried in sandy bed of the sea in the intertidal zone. However, only empty shells collected in the area in large numbers earlier by Ramakrishna and Subba Rao in 1962 and 1964.

Class BIVALVIA

Order ARCOIDA

Family ARCIDAE

71. *Anadara granosa* (Linnaeus, 1758)

Recorded localities : K. G. Madeli, False point, mouth of Mahanadi near Light House, Gangolia, Creek near Paradip.

Remarks : An estuarine in its habitat, known as 'Ark shell', found buried in the soft mud in the river mouths and back waters. It is being commercially cultured for their soft parts which are edible, and shells are for manufacturing the lime. Large quantities of these shells are collected at Sonnapur backwaters near Ichapuram and Kakinada Bay.

72. *Anadara rhombea* (Born, 1780)

Recorded localities : K. G. Madeli, Hukitola, mouth of Mahanadi near Paradip.

Remarks : This species is marine in its habitat, attached to the rocks and boulders on the coast. Only empty shells washed into the estuary.

73. *Scapharca deyrollei* Jousseau, 1893

Recorded localities : K. G. Madeli, Light House, Gangolia, Creek near Paradip.

Remarks : Marine in its habitat. Large number of empty shells found washed along the shore and some of them are entered into the estuary by the tidal waters.

74. *Scapharca inaequalis* (Bruguiere, 1789)

Recorded localities : K. G. Madeli, False Point, mouth Mahanadi near Light house, creek near Paradip.

Remarks : Similar to the preceding species. Only empty valves are found in the locality.

Family NOETIIDAE

75. *Striarca lactea* (Linnaeus, 1758)

Recorded localities : False Point.

Remarks : This species occurs in the estuarine habitat. Only empty valves are collected in the estuary. Some of the shells of this species even entered into Chilka Lake at Satpara. Live shells are found along with *Barbatia bistrigata* among mud covered rocks and oyster beds. (Subba

Rao et al. 1991). It is also recorded from Sunderbans of Bakkali and Jharkhali.

Family GLYCYMERIDIDAE

76. *Glycymeris tenuicostatus* (Reeve, 1843)

Recorded localities : K. G. Madeli, Mouth of Mahanadi near Light House, Paradip, creek near Paradip Port.

Remarks : Truly marine in their habitat. Empty valves are commonly found on the shore, might have washed into the estuary.

Order MYTILOIDA

Family MYTILIDAE

77. *Perna viridis* (Linnaeus, 1758)

Recorded localities : Mangrove forest, Paradip.

Remarks : It is a backwater species, usually found in clusters attached to the substratum near river mouths and backwaters on the coast. It is being cultured for its flesh which is edible. It is recorded for the first time from Mahanadi estuary.

78. *Modiolus (Modiolus) striatulus* Hanley, 1843

Recorded localities : K. G. Madeli, Flase Point.

Remarks : This species inhabits in brackishwaters, found attached to the stones, boulders etc. on the coast and in brackwaters. Very common in Gangetic delta, Kidderpore docks, Chilka Lake, Ennur and Cochin backwaters. Chocking of the water pipes in Palta water works by this species was noticed earlier.

Order PTERIOIDA

Family PECTINIDAE

79. *Amusium pleuronectis* (Linnaeus)

Recorded localities : Mouth of Devi river at 42-46m depth.

Remarks : This species is marine in its habitat. Prefers bed of soft sand admixed with mud. Usually lying the bed. No fresh collections are made recently.

80. *Volachlamys tranquebarica* (Gmelin)

Recorded localities : K. G. Madeli, Paradip. Astranga near Devi river mouth.

Remarks : Its habitat is similar to the preceding species. Only empty valves collected recently in the vicinity.

Family ANOMIIDAE

81. *Anomia* sp.

Recorded locality : Gangolia near Paradip.

Remarks : Material in hand is a single upper valve only, having the characters of the genus. Since the material is in a damaged condition, its specific identification is not given. The genus is recorded for the first time from Mahanadi. It is usually found attached to the boulders and mangrove vegetation.

82. *Engimonia aenigmatica* (Holten, 1795)

Recorded localities : K. G. Madeli, False Point.

Remarks : This species usually found attached to the substratum especially to mangrove plants near the river mouth. No fresh collections are studied.

83. *Placuna placenta* (Linnaeus, 1758)

Recorded localities : Machergaon, Sunadhoora, Astranga near Devi River mouth.

Remarks : This species is known as "windowpane oysters" inhabits in estuarine and brackish-waters along the coast. Shells are thin, shining, occurs buried in the soft mud. The animals produces pearls of not commercial value. It is recorded earlier from Chilka Lake in Orissa. Valves of this species are used in manufacture of lamp shades.

Family OSTREIDAE

84. *Crassostrea cuttackensis* (Newton & Smith, 1912)

Recorded localities : Hukitola, K. G. Madeli.

Remarks : An estuarine species occurs buried in soft mud in the estuaries and back waters. Shells are very large and heavy. Animals are found in clusters and its flesh is eaten by the local people. In Sunderbans shells are used in manufacturing the lime.

85. *Saccostra cucullata* (Borm 1778)

Recorded localities : K. G. Madeli, Gangolia, Paradip.

Remarks : This species occurs both marine and estuarine habitats, found in clusters attaches to the stones, wooden jetties, piles, mangrove stumps and even other shells in the area. Few live samples collected and studied.

Order VENEROIDA

Family CARDITIDAE

86. *Cardites antiquata* (Linnaeus, 1758)

Recorded localities : K.G. Madeli, Mahanadi river mouth near Light House, and near by creek, Paradip.

Remarks : This species occurs in marine habitat, empty shells washed ashore, find its way into the estuary.

Family CARDIIDAE

87. *Acanthocardia coronata* (Schroeter, 1786)

Recorded localities : K.G. Madeli, False Point, Mahanadi river mouth, mangrove forest, creek Gangolia, near Paradip, Battaghara, Hukitola.

Remarks : This species inhabits in marine waters, prefers muddy soil near the river mouths and backwaters. No live shells find in the area. Collection includes large number of valves only.

88. *Trachycardium variegatum* (Sowerby, 1840)

Recorded localities : K.G. Madeli.

Remarks : Marine in their habitat. Empty shells washed into the area are collected.

Family MACTRIDAE

89. *Mactra (Mactra) cuneata* Gmelin, 1791

Recorded localities : K.G. Madeli.

Remarks : This species is marine in its habitat, prefers fine sandy bed admixed with little mud in shallow beaches in littoral zone. Empty shells find their way into the estuary.

90. *Mactra (Mactra) grandis* Gmelin, 1791

Recorded localities : K.G. Madeli

Remarks : Same as preceding species.

91. *Mactra (Mactra) luzonica* Deshayes

Recorded localities : K.G. Madeli, Creek near Paradip.

Remarks : Same as preceding species in their habitat. This species is recorded so far from Orissa coast only.

92. *Mactra (Coelomactra) turgida* Gmelin, 1791

Recorded localities : K.G. Madeli, Mahanadi river mouth near Light House, Mangrove forest Paradip.

Remarks : Marine in its habitat. Only empty shells find their way into the estuary.

93. *Mactra (Coelomactra) violacea* Gmelin, 1791

Recorded localities : Mangrove forest, Mahanadi river mouth near light House, Paradip.

Remarks : In habits in marine waters, near river mouths, prefers fine shallow sandy bed admixed with mud. Empty shells are found its way into the estuary. Though this species has been recorded from Orissa coast, but not from Mahanadi estuary, it is recorded for the first time. It is very common species in the Indian coast.

94. *Mactra (Macrinula) laevis* Chemnitz

Recorded localities : Mahanadi river mouth near Light House, Paradip

Remarks : Similar to the preceding species, but rare.

95. *Spisula (Standella) annandalei* Preston, 1915

Recorded localities : Mouth of Devi River.

Remarks : This species is brackishwater in its habitat, described from Chilka Lake in Orissa. It is recorded for the first time from Mahanadi estuary. The collection includes a single specimen, hence no comment was made on its distribution.

Family SOLENIDAE

96. *Solen annandalei* Preston, 1915

Recorded localities : Mouth of Devi River.

Remarks : It is a brackishwater species, prefers shallow waters, buried in soft mud and fine sands. It is described from Chilka lake in Orissa earlier and also record from Tamil Nadu near Madras. It is reported from the estuary for the first time.

97. *Solen kempi* preston, 1915

Recorded localities : Mouth of Devi River.

Remarks : Similar to the preceding species. It closely resembles *annandalei*, but linear, narrow and its posteriodorsal margin angular. It is also recorded for the first time from the Mahanadi estuary.

Family CULTELLIDAE

98. *Siliqua (Siliqua) radiata* (Linnaeus, 1756)

Recorded localities : K.G. Madeli.

Remarks : This species prefers mudflats near the river mouth oftenly empty shells being washed into the shore. Shell thin, violet in colour with 4 to 5 radiating white bands looks like setting sun and hence known as 'Sunset' shells.

Family TELLINIDAE

99. *Macoma (Psammacoma) birmanica* (Philippi, 1849)

Regarded localities : Mouth of Mahanadi near Light House, Paradip.

Remarks : This species is estuarine in its habitat, prefers loose soft mud in the river mouths. They burry in the soil at subsurface level. It is also recorded from Chilka Lake.

100. *Macoma (Psammacoma) truncata* Jonas, 1844

Recorded localities : Mahanadi estuary.

Remarks : No fresh specimens collected from the estuary. This species prefers mud flats on the shore near the river mouths.

101. *Tellina (Dalitellina) rostrata* Linnaeus, 1958.

Recorded localities : K.G. Madeli, Paradip.

Remarks : This species prefers shallow mudflats admixed with sand on the coast. No live specimens recorded except some valves washed on the shore.

102. *Tellina (Tellinides) sinuata* spengler, 1798

Recorded localities : Mangrove forest near Paradip.

Remarks : Similar to the preceding species. Only valves are found washed into the estuary.

103. *Apolymetis edentula* Spengler, 1782

Recorded localities : False Point, Mahanadi river mouth Paradip.

Remarks : No live specimens so far recorded in the estuary, though they prefer soft mud flats on the shore.

Family DONACIDAE

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

Recorded localities : K.G. Madeli.

Remarks : This species prefers shallow sandy bed admixed with mud near the river mouths. No live shells are found inside the estuary.

Family PSAMMOBIIDAE

105. *Gari (Gari) maculosa* (Lamarck, 1818)

Recorded localities : Paradip Port area.

Remarks : Though this species inhabits in mud flats, no live specimens are collected. Only few empty valves washed on shore near the Port area.

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

Recorded localities : Mouth of Mahanadi near Paradip, Astranga near Devi River mouth.

Remarks : This species prefers mud flats near the mouth along the coast. They prefer admixture of sand and mud. Often empty shells find their way into the estuaries by the tidal waters. It is recorded from the Gangetic delta in Sunderbans. Presence of this species can be noticed by characteristic circular hole through which water ejects out by their siphons when they disturbed (Subba Rao et al. 1992). It is recorded for the first time from the estuary.

Family CORBICULIDAE

107. *Polymesoda (Geloina) bengalensis* (Lamarck, 1818)

Recorded localities : False Point.

Remarks : This species is estuarine in their habitat, collected from the mud flats earlier in live condition. No recent collections are made.

Family VENERIDAE

One of the largest family among the bivalves, which includes commercial and edible species.

108. *Meretrix meretrix* (Linnaeus, 1758)

Recorded localities : Mouth of Mahanadi river, Mangrove forest, Light House, Paradip; Astranga near Devi river mouth. Machergaon, Sunadhoora.

Remarks : This species is an estuarine in its habitat. Prefers shallow sandy bed admixed with mud near the river mouths and backwaters. It burrows at subsurface level. Collected in large numbers for its flesh which is edible and its shells for lime manufacture. Only empty shells washed inside the estuary were collected.

109. *Meretrix casta* (Gmelin, 1991)

Recorded localities : Fales Point, K.G. Madeli, Paradip.

Remarks : Similar to the preceding species, but they prefer backwater areas away from the river mouth. Present collections are only empty valves collected on shore near the mouth. However, live specimens are recorded from Chilka Lake near its mouth.

110. *Sunetta (Sunetta) effosa* (Hanley, 1842)

Recorded localities : K.G. Madeli, Mahanadi river mouth, Mangrove forest, Creek near Paradip.

Remarks : This species prefers sandy beaches in shallow intertidal regions. No live shells

found in the estuary. Only empty valves are found its way into the estuary.

111. *Sunetta (Sunetta) donacina* Gmelin, 1791

Recorded localities : K.G. Madeli, Mahanadi river mouth near light house, Paradip.

Remarks : Similar to preceding species, but rare.

112. *Sunetta (Sunetta) scripta* (Linnaeus, 1758)

Recorded localities : K.G. Madeli, Mahanadi river mouth, Paradip.

Remarks : Its habitat is similar to preceding two species. However, it is the commonest species in the Orissa coast. No live shells collected in the estuary.

113. *Sunetta (Sunetta) meroe* (Linnaeus, 1758)

Recorded localities : K.G. Madeli, Mahanadi river mouth near Light House, Gangolia, Paradip.

Remarks : It is marine in its habitat. Occurs in sandy beaches. No live shells are found in the estuary. However, large number of empty shells collected near the mouth. It is another common species in the coast.

114. *Pelecypora (Pelecypora) excisa* (Schroeter, 1788)

Recorded localities : K.G. Madeli, Mahanadi river mouth near Light house, Gangolia, Paradip.

Remarks : This species inhabits in the estuarine habitat, prefers muddy soil. No live shells collected from this estuary. However, empty valves are found their way in the vicinity.

115. *Pelecypora (Pelecypora) trigona* (Reeve, 1850)

Recorded localities : Mahanadi river mouth Paradip

Remarks : This species occurs in the habitat of the preceding species. No live shells collected. However, it is represented by empty valves only. It is common in Gangetic delta, and Chandipore.

116. *Dosinia (Asa) tumida* (Gray, 1838)

Recorded localities : Paradip.

Remarks : This species prefers shallow sandy beaches admixed with mud. No live specimens collected. It is recorded in Chilka lake near Manikpatna by an empty shells.

117. *Marcia (Marcia) pinguis* (Schroeler, 1788)

Recorded localities : Mouth of Mahanadi near Light House, Gangolia, Paradip, Hukitola.

Remarks : It is an estuarine species commonly occurs in backwaters near the river mouth

on the coast. They prefer fine sandy bed intermixed with mud. It is very common in Chilka Lake and Kushabhadra river mouths.

118. *Marcia (Marcia) recens* (Dillwyn, 1795)

Recorded localities : Mouth of Mahanadi near Light House, Paradip.

Remarks : Similar to the preceding species, but not so common. Recorded for the first time.

119. *Paphia malabarica* (Schroeter, 1788)

Recorded localities : Mahanadi river mouth near light house Paradip.

Remarks : It occurs in estuaries and backwaters, common throughout India. It prefers soil admixture of sand and mud. It's flesh is eaten by local fishermen. It is recorded for the first time.

120. *Paphia textrix* (Schroeter, 1788)

Recorded localities : Mouth of Mahanadi near light House, Paradip.

Remarks : This species inhabits in marine waters, prefers sandy beaches with little admixture of mud. It is known as *Paphia textile*, surface covered with violet reticulated markings and fine concentric lines. It is recorded for the first time.

121. *Paphia undulata* (Born, 1778)

Recorded localities : Mahanadi river mouth near Light House Paradip.

Remarks : This species prefers similar habitat of *P. malabarica*. It is recorded from Chilka lake earlier and now recorded from Mahanadi estuary based on the empty shells.

122. *Ruditapes bruguiera* (Hanley, 1845)

Recorded localities : Mouth of Mahanadi near Light House, Mangrove forest, Paradip

Remarks : This species inhabits in sandy coasts on the shore. Empty shells are washed ashore in large numbers. It is not recorded earlier from Orissa coast. However empty shells are found their way into the estuary.

123. *Timoclea arakana* (G. & H. Nevill, 1871)

Recorded localities : Paradip.

Remarks : This species prefers sandy beaches in marine environment. Only empty shells find their way into the estuary. It is recorded from Chilka Lake earlier. A rare species.

124. *Timoclea imbricata* (Sowery, 1853)

Recorded localities : K.G. Madeli, Gangolia, Creek near Paradip Port.

Remarks : It is also occurs in sandy bed along the coast. Large number of empty valves found washed ashore. Some of these are collected on the shore near the areas mentioned.

125. *Batissa calophylla* (Philippi, 1836)

Recorded localities : K.G. Madeli.

Remarks : This species occurs in marine sandy beaches along the coast. Occasionally empty valves are washed ashore. No live shells are collected.

Family GLAUCONOMIDAE

126. *Glaucanome sculpta* Sowerby, 1894

Recorded localities : Mouth of Mahanadi river area.

Remarks : This species occurs in estuarine habitat, found burried in the mud flats. It is very common in Sunderbans and in Orissa, it is recorded from Burhibalong river, Talesari river mouth near Chandipore. However, some empty shells are collected in the estuary. Details of its ecology was given by (Subba Rao *et al.* 1991).

Order MYOIDA

Family CORBULIDAE

127. *Corbula rotalis* Hinds, 1843

Recorded localities : Mahanadi river Mouth near Light House, Paradip, Off Devi river mouth.

Remarks : This species is estuarine in its habitat, found burried in the mud flats. No live specimens collected during present survey. However, specimens recorded earlier by Bengal Fisheries in 1909.

Family PHOLADIDAE

128. *Barnea candida* (Linnaeus, 1758)

Recorded localities : Mangrove forest, Light house area near Paradip.

Remarks : This species found to occur in mudflats. An estuarine in its habitat. Only empty shells found in the vicinity, might have washed into the estuary. It is recorded for the first time.

129. *Pholas (Pholas) orientalis* (Gmelin, 1791)

Recorded localities : Mahanadi river mouth near Light house, mangrove forest, Battagahara near Paradip.

Remarks : This species also occurs in the same habitat as the preceeding species. However only empty valves are collected in the vicinity might have washed from other nearby localities.

130. *Martesia (Martesia) striata* (Linnaeus, 1758)

Recorded localities : K.G. Madeli.

Remarks : This species found to attack submerged and floating wooden structures in the sea, harbour jetties etc. by making burrows into the wood and live inside and causing damage to the wood. No fresh collections are studied.

131. *Martesia delicatula* Preston, 1910

Recorded localities : Mouth of Devi river.

Remarks : It's habitat is similar to the preceding species. No fresh collections are studied in recent years.

Family TEREDINIDAE

No fresh collections are made in the estuary during recent years. All the collections are studied in detail earlier by Subba Rao (1968).

132. *Bactronophorus thoracites* Gould, 1859

Recorded localities : K.G. Madeli

Remarks : This species found to attack the mangrove plants, 'Sundari', 'Rai, Gamma, Kherua in the mangroves nearby. It attacks only dead wood.

133. *Dicyathifer manni* (Wright, 1866)

Recorded localities : K.G. Madeli, False Point.

Remarks : This species usually attack Raj and Kherua, Gamma, Sundari trees.

134. *Lyrodus pedicillatus* (Quatrefages, 1849)

Recorded localities : K.G. Madeli, Lion's Rumph.

Remarks : This species is found to attack 'Sundari' and Karanja trees in the estuary.

135. *Bankia campanellata* Moll and Roch, 1931

Recorded localities : Lion's Rumph, K.G. Madeli.

Remarks : This species is found to attack the wood, Kherua, Rai, Sundari, Katai in the estuary.

136. *Bankia carinata* (Gray, 1827)

Recorded localities : K.G. Madeli.

Remarks : It is found to attack the wood Kharanja in the estuary.

137. *Bankia fimbriata* Moll and Roch

Recorded localities : Paradip port area, False Point.

Remarks : This species is found to attack the trees Kherua and Rai in the estuary.

138. *Bankia rochi* Moll, 1931

Recorded localities : K.G. Madeli, False Point, Paradip.

Remarks : This species attacks the wood 'Rai, Sundari, Gamma, Kherua in the estuary. It was recorded earlier as *Bankia roonwali* Rajagopalaiengar.

139. *Nausitora dunlopei* Wright, 1864

Recorded localities : K.G. Madeli, False point, Paradip.

Remarks : It is recorded from the trees Kherua, Sundari, Rai, Katai, Ragi, Gamma, Bania in the estuary.

140. *Nausitora fusticula* (Jeffreys, 1860)

Recorded localities : False Point.

Remarks : This species is found to attack on the trees Kherua near light house area.

141. *Nausitora hedleyi* Schepman, 1919

Recorded localities : Hukitola.

Remarks : This species has been extracted from dead wood of Kherua.

142. *Nausitora knoxi* (Bartsch, 1917)

Recorded localities : Lion's Rumph.

Remarks : This species has been extracted from Sundari wood infested with the species, *Bankia campanellata*.

143. *Teredora princisae* (Sivicks, 1928)

Recorded localities : K. G. Madeli.

Remarks : This species collected from Bamboo washed ashore.

Order PHOLADOMYOIDA

Family PANDORIDAE

144. *Pandora brevifrons* Sowerby, 1835

Recorded localities : Off Devi River.

Remarks : An estuarine in its habitat, found to occur in the mudflats. It was recorded earlier under, *Pandora perangusta* Preston which is a synonym of the present species. No fresh collections are studied.

Family LATERNULIDAE

145. *Laternula navicula* (Reeve, 1863)

Recorded localities : Mouth of Devi River, Mahanadi river mouth near Paradip.

Remarks : Estuarine in its habitat. Generally found burried in the soft loose mud. shells are very thin and fragile. It is recorded earlier from Chilka Lake under the species *Anatina granulosa*, *Anatina barkulensis*, *Anatina barkudaensis* and *Lyonsia samalinsulae*. This species is recorded for the first time in Mahanadi estuary.

146. *Laternula* sp.

Recorded localities : Astranga near Devi River mouth.

Remarks : Only a single valve collected near the fishing jetty but damaged. However it closely resembles, *Laternula truncata* (Lamarck, 1818) recorded from Suvarnarekha river mouth.

Class CEPHALOPODA

The class Cephalopoda includes, cuttlefish, squids, octopuses etc. which are purely marine in their habitat occurs in off shore areas. However, these animals may visit near shores and enters into backwaters occasionally. But they are not considered here as estuarine species.

Order SEPIOIDA

Family SEPIIDAE

147. *Sepiella inermis* Ferussac et. d'Orbigny 1835-48

Recorded localities : Off Paradip, Off Devi River, Mahanadi branch.

Remarks : This species occurs in marine waters. Specimens collected from the fishermen's nets.

Order TEUTHOIDA

Family LOLIGINIDAE

148. *Loligo devaueceli* Ferussac et. d'Orbigny

Recorded localities : Off Paradip, Mouth of Devi River.

Remarks : Common in Indian waters, specimens collected from fishermen nets in the vicinity.

149. *Loliolus investigatoris* Goodrich, 1850

Recorded localities : Off Paradip.

Remarks : It is a marine species, collected from the fishermen's nets.

GENERAL REMARKS

The collections thus studied, both live and dead shells from the estuary, includes a total of 149 species under 98 genera and 55 families. Of these 33 species (12 gastropods and 21 bivalves) marked with an asterix (*) in the list are not recorded earlier from the estuary. Of the 11 species of gastropods except for *Onchidium tenerum* rest of all are marine and among bivalves 13 species are estuarine and 9 species are marine. The latter are represented by empty valves only.

Based on the nature of their occurrence these are mainly divided into the following categories.

1. Molluscs associated with vegetation, 2. Molluscs living among mudflats and 3. Molluscs living attached to substratum such as rocks, boulders and jetti piles etc. in the estuaries.

1. **Molluscs associated with vegetation** : These are further classified as i) Animals live on the surface of the vegetation either crawling or attached to the branches, leaves or pneumatophores and in the crevices, such as *Nerita articulata*, *Neritina viroacea*, *Littorina melanostoma*, *L. undulata*, *Cerithidia obtusa* and *Onchidium verruculatum* among gastropods, and bivalves *Anomia* sp. *Enigmonea aenigmatica* and *Saccostrea cucullata* attach themselves to the branches by one of their valves. ii) Animals live inside the wood by making tunnels or holes into submerged or floating wood such as *Bactronophorus thoracites*, *Bankia campanellata*, *B. carinata*, *B. fimbriata*, *B. rochi*, *Dicyathifer manni*, *Lyrodus pedicellatus*, *Nausitora dunlopei*, *N. fusticulata*, *N. Hedleyi*, *Nototrede knoxi*, *Teredora princisae* are known as 'shipworms' which live in tunnels and *Martesia delicatula*, and *M. striata* known as 'Piddocks' which live in the holes made into the wood.

2. **Molluscs live among mudflats** : Many molluscs live in this habitat either as an epifauna or infauna. Majority of the gastropods live as epifauna by crawling on the surface of the mud flats on the exposed bed. These are *Assimineia theobaldiana*, *A. woodmasoniana*, *Cerithidea cingulata*, *Telescopium telescopium*, *Trebralia palustris*, *Pugilina cochlidium*, *Onchidium tenerum* and *O. verruculatum*. All these are found on the mud flats between the tide marks. The shallow mud flats admixed with sand near the mouth are preferred by the following gastropods, *Umbonium vestiarium*, *Cerithidea cingulata*, *Acrilla acuminata*, *Natica tigrina*, *Nassarius stolatus* and *N. subconstrictus*. Whereas *Ellobium gangeticum* and *Pythia plicata* prefers highwater mark.

In fauna such as bivalves burrow inside the soil and the depth varies from species to species. The species found are *Anadara granosa*, *Striarca lactea*, *Placuna placenta*, *Crassostrea cuttackensis*, *Solen annandalei*, *S. kempfi*, *Spisula annandalei*, *Macoma birmanica*, *Sanguinolaria acuminata*, *Polymesoda bengalensis*, *Marcia pinguis*, *Meretrix meretrix*, *M. casta*, *Pelecypora excisa*, *P. trigona*, *Timoclea imbricata*, *Paphia malabarica*, *Glaucanome sculpta*, *Corbula rotalis*, *Barnea candida*, *Laternula navicula* and *L. truncata* (?). Among these, *Anadara granosa*, *Sanguinolaria acuminata*, *Marcia pinguis*, *Meretrix meretrix* and *M. casta* are very common.

3. *Molluscs occur on hard substratum* : Hard substratum such as rocks, boulders, jetty piles etc. in the estuaries near its mouth and vicinity the following molluscs are recorded. Among gastropods *Nerita articulata* found in large numbers on the rocks and on jetty piles at Hukitola near the mouth, whereas *Pseudanerita sulculosa* occurs on the wood as well as empty tunnels made by shipworms, *Thais lacera* occurs on both rocks and jetty piles. Very few bivalves viz. *Perna viridis*, *Modiolus striatulus*, *Saccostrea cucullata*, *Anomia* sp. *Enigmonaea enigmatica* found attached to the substratum, the former two species are attached themselves by their byssus threads and rest are by their one of the valves. The species, *Saccostrea cucullata* also found to attach on other shells such as *Cerithidea cingulata*, *Telescopium telescopium*, *Pugilinus cockliidium*.

In addition to the above species recorded, the species which are marked with + in the list dealt with are represented by empty shells or valves. Many of them are either washed into the estuary by the tidal waters or carried into estuary by hermit crabs which take shelter in the empty shells. However, cephalopods recorded are collected from the fishermen's nets who collected them in the off shore areas in the sea.

In recent years Subba Rao et. al. (1995) studied the malacofauna of Hooghly Matlah estuary and recorded a total of 130 species under 86 genera and 57 families, including 15 species of freshwater habitat collected in the upper reaches of the estuary. Many species are common to both Hooghly-Matlah and Mahanadi estuaries. However, the species of the following families which are of estuarine habitat are not recorded in Mahanadi estuary are Acmaeidae (1), Cyclostrematidae (1), Stenothyridae (7), Pyrenidae (1), Atyidae (1), Cylichnidae (1), Aglajlidae (1), Ringiculidae (1), Semelidae (1), Solecurtidae (1), Trapezidae (1), Myidae (1) and Cuspidariidae (1). The number in the parenthesis represents the number of species under the family.

Rao et al (1992) studied the ecology and fauna of Rushikulya estuary and listed a total of 48 species under 35 genera and 15 families. Out of them, only the species, *Telescopium telescopium*, *Cerithidea cingulata*, *Natica gualteriana* among gastropods and *Anadara granosa*, *Scapharca deyrollei*, *Perna viridis*, *Anomia achaeus*, *Crassostrea cuttackensis*, *Solen truncatus*, *Meretrix meretrix*, *M. casta*, *Marcia pinguis*, *Timoclea imbricata* of the bivalves, are of estuarine in their habitat. All these species are common to both Mahanadi and Hooghly Matlah estuaries. Many of the species collected are either dead shells or empty valves and are of marine habitat. Further, there are 9 species such as *Bellamyia bengalensis*, *B. dissimiles*, *Pila globosa*, *Thiara granifera*, *T. lineata*, *T. torulosa* and *Indoplanorbis exustus* of the gastropoda and bivalves of *Perrysia corrugata* and *Corbicula striatella* are recorded from Rushikulya are of freshwater habitat.

Presence of the freshwater species is attributed either of the low salinity prevailing in the estuary at the time or might have been washed from the upper reaches where there is no tidal effect.

SUMMARY

A total of 149 species under 98 genera and 55 families have been recorded from Mahanadi estuary based on the recent collections received from Estuarine Biological Research Station, Berhampur, Ganjam, as well as present in the National Zoological Collections and literature. Of these 33 species (12 gastropods and 21 bivalves) are reported for the first time from the estuary.

Since many species reported here were included in the "Fauna of Orissa : Marine molluscs", by Subba Rao et al. (1991) no original reference and synonyms of the species are given in the systematic account. Ecology of the species has been discussed and comparison of the fauna with that of Rushikulya and Hooghly-Matlah estuaries have been made.

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POLYCHAETA : ANNELIDA

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INTRODUCTION

Polychaeta fauna forms a major component among the benthic invertebrates of the estuaries, brackish waters and lagoons along with crustaceans and molluscs. The nutrient rich estuarine waters and its bottom sediments formed by sand/silt and clay mixture with high organic matter provides an ideal habitat for a large number of polychaetes, though not rich in diversity. Further the vast mangrove vegetations around the criss-cross channels of the river before joining the sea also facilitates polychaeta population to colonize around the mangrove stems, both living and dead in association with several other invertebrates.

Detailed studies on polychaete fauna from different estuaries, lagoons and backwaters along the Indian coasts viz. Sundarbans (Gangetic Delta), Godavari estuary, Vellar estuary and Chilka Lagoon etc., are available. (Misra et. al. 1983 & 1985, Srinivasa Rao & Rama Sarma 1979 & 1982, Sri Krishna Das et al. 1987 and Rao C.A.N. 1993). Though Mahanadi is a major river and forms a highly complex estuarine system alongwith some other rivers opening to the Bay of Bengal very close to it, our knowledge on the details of its fauna and ecology is meagre. A project for detailed study on the ecology and fauna of Mahanadi estuarine complex was taken up by Zoological Survey of India, Berhampur during 1989-92.

As a part of this, several faunastic surveys were conducted to different estuarine areas around Mahanadi and its branches including the highly inaccessible mangrove areas viz. Battighar, Hukitola (False point) during different seasons to collect various groups of fauna and ecological information.

The polychaete material reported in this paper was collected during 10 faunastic surveys undertaken by Drs. D. S. Mathur (D.S.M.) C.A.N. Rao, (C.N.R.) and Sri T. Venkateswarlu (T.V.). In this paper 33 species of polychaetes are reported from Mahanadi estuary and as the species reported here are already well described, some diagnostic features, variations if any observed and distribution along the Indian coast for each species only is given in this paper.

SYSTEMATIC ACCOUNT

Family PILARGIDAE

Talehsapia annandalei Fauvel, 1932

Material : 2 exs., Chowmahan, Paradeep; 06.12.1989; D.S.M. 1 ex., Gangolia, Paradeep;

16.02.1989; T.V. 1 ex., River mouth, Paradeep; 17.02.1989; T.V. 6 exs., Devi river-mouth, Astranga, 26.10.1990; C.N.R. 1 ex., Devi river-mouth, Astranga, 19.02.1990; C.N.R.

Description : Narrow, very long specimens about 30 cm. and brick-red in colour. First few segments slightly swollen; Prostomium small lobe-like without eyes, palps and antennae; Peristomium achaetous without tentacles; Proboscis with a pair of horny jaws at its tip. Feet uniramous with a blunt ventral lobe and 5-8 long capillary setae. Dorsal lobe reduced with an aciculum extended outside and with 1-2 simple setae, a pair of anal cirri.

Distribution : Baitarini estuary, Chandbali, Orissa, Sagar Island, Gangetic Delta, West Bengal.

Family PHYLLODOCIDAE

Eteone barantollae Fauvel, 1932

Material : 1 ex., Devi river-mouth, Astranga, 19.02.90, C.N.R.

Description : Specimen 3-4 cm. in length and flattened body of several segments; prostomium plate-like with 2 pairs of small antennae and a pair of eyes; peristomium with 2 pairs of tentacles; first setigerous segment without dorsal cirri; dorsal cirri leaf like and enlarged towards the posterior side; setae compound.

Distribution : Reported earlier from Bitarkanika river beach near Chandbali, Orissa; Salt water lakes near Calcutta.

Eulalia (Eumida) sanguinea Oersted, 1943

Material : 4 exs., Devi river-mouth, Astaranga, 20.02.1990, C.N.R.

Description : 3-4 cm., in length and flattened body; prostomium plate-like with its anterior end broader having a pair of small antennae at each corner, a median antennae in the middle of the prostomium and a pair of dark eyes situated at the ventrolateral corners; four tentacular cirri on either side; feet uniramous with heart-shaped dorsal cirri, setae compound and proboscis smooth.

Distribution : Puri, Orissa; Gulf of Mannar.

Family NEREIDAE

Namalycastis indica (Southern, 1921)

Material : 6 exs., Nuna Bridge, Paradeep, 16.02.1989; T.V. 2 exs., Gangolia, Paradeep; 10.02.1989; T.V.

Description : Specimens 2-3 cm. in length and white in colour; body appears wide due to the enlarged feet towards the posterior side; feet uniramous with an elongated dorsal cirri becoming enlarged and flattened towards the posterior side with 1-2 dorsal setae; ventral setae heterogomph falcigers with long terminal pieces.

Distribution : Reported from estuaries and brackish-waters all along the Indian coast.

Namalycastis fauveli Rao, 1981

Material : 3 exs., Devi river-mouth, Astaranga; 22.02.1989, T.V. 2 exs., Devi river mouth, Astaranga; 20.02.1990; C.N.R. 2 exs., Musadia, near Paradeep; 11.04.1992; C.N.R.

Description : Long and narrow specimens of about 3 cm. prostomium tetragonal with minute antennae, a pair of palps and prominent eyes; tentacular cirri short; feet uniramous with enlarged dorsal cirri which becomes broader and elongated towards the posterior side; 1-2 notosetae and several neurosetae which are compound with one arm of the forked basal piece highly elongated.

Distribution : First described from Baitarani estuary, Chandbali, close to Mahanadi estuary and later from Chilka Lagoon.

Dendronereis arborifera Peters, 1854

Material : 11 exs., Battighar, from muddy areas of mangroves, Paradeep, 19.10.1990; C.N.R. 1 exs., Chowmohan, Paradeep; 06.12.1989; D.S.M. 3 exs.; Chowmohan, Paradeep; 16.02.1989; T.V.

Description : About 4-5 cm., in length; pinnate branchial filaments inserted on the dorsal cirri from 11th to 20th segments only.

Distribution : Collected from the muddy sediments around mangrove trunks. Chandbali, Orissa, Gangetic delta and Godavari estuary.

Dendronereis aestuarina Southern, 1921

Material : 1 ex., Devi River-mouth, Astaranga; 19.02.1990; C.N.R.

Description : About 4 cm., in length, proboscis with soft papillae on the basal ring; branchial filaments with small lateral branches (bi-pinnate gills) inserted on the dorsal cirri from 12th segment.

Distribution : Earlier reported from Gangetic Delta, Vellar estuary; Tamilnadu & Kerala coast.

Dendronereides heteropoda Southern, 1921

Material : 2 exs., Battighar, Paradeep; 10.04.1992; C.N.R., 3 exs., Musadia, Paradeep, 11.04.1992; C.N.R., 30 exs., Nuna Bridge, Paradeep; 13.02.1990; C.N.R. 1 ex., Devi river-mouth Astaranga, 20.02.1990; D.N.R., 33 exs., Devi river-mouth, Astaranga, 26.10.1990; C.N.R., 4 exs., Gangolia, Paradeep; 16.02.1989; T.V. 1 ex., River-mouth, Paradeep, 06.12.1989; D.S.M., 2 exs., Battighar, Paradeep, 19.10.1990; C.N.R.

Description : About 1-3 cm., in length; chitinous paragnaths absent; branchial filaments situated below the dorsal cirrus from 4-8th segments and present on about 20-25 segments only. Anterior feet with two lobes in each ligule, while posterior feet with single lobe in each ligule with setae; Fauvel (1953) reported absence of ventral ligule in the posterior feet.

Distribution : Widely distributed in the Mahanadi Estuary. Reported earlier from Gangetic Delta, Chandipur, Orissa and coast of Bombay.

***Tylonereis bogoyawlensky* Fauvel, 1911**

Material : 4 exs., Hukitola, Paradeep; 20.10.1990; C.N.R.

Description : 3-4 cm., in length, proboscis with soft papillae only; all feet biramous with only homogomph spinegers; dorsal rami bilobed with an upper leaf like ligule and a bulbus lower one; ventral rami trilobed.

Distribution : Reported from Gulf of Mannar and Kerala Coast.

***Nereis (Neanthes) chingrighattensis* Fauvel, 1932**

Material : 3 exs., Gangolia Paradeep; 22.10.1990; C.N.R., 6 exs., River-mouth, Paradeep; 05.12.1989; D.S.M., 10 exs., Battighar, Paradeep; 19.03.1991; T.V., 2 exs., Chowmohan, Paradeep; 16.02.1989; T.V., 28 exs., River-Mouth, Paradeep; 20.03.1991; T.V., 18 exs., Mangrove forest, Paradeep; 17.03.1991; T.V., 10 exs., River-Mouth, Paradeep; 14.02.1991; C.N.R.

Description : Chitinous Paragnaths present on all groups except on group V; parapodia with three lobes in each ligule, only spinigerous setae; falcigers absent.

Distribution : Earlier reported from Gangetic delta, and Chilka Lagoon. Widely distributed in this estuary.

***Nereis (Neanthes) glandicineta* Southern, 1921**

Material : 70 exs., Mangrove forest, Paradeep; 24.07.1990; T.V., 6 exs., River-mouth, Paradeep; 07.12.1989; D.S.M., 40 exs., Devi river-mouth, Paradeep; 17.10.1990; C.N.R., 9 exs., Hukitala, Paradeep; 20.10.1990; C.N.R., 20 exs., Hukitala, Paradeep; 13.02.1990; C.N.R.

Description : Specimens 5-10 cm. in length, chitinous paragnaths are present on the oral ring; paragnaths absent on the basal ring except 1-2 transparent paragnaths on group VI; falcigerous setae absent on the notopodia.

Distribution : Reported from Chilka Lagoon, Brackish waters of Visakhapatnam and Cochin.

***Nereis (Neanthes) succinea* (Frey & Leuckart, 1847)**

Material : 30 exs., River-mouth, Paradeep; 08.04.1992; C.N.R.

Description : About 5-6 cm. in length; anterior region reddish-brown in colour; paragnaths present on all groups; notopodia and neuropodia each with 3 lobes; the dorsal lobe of the notopodia in the middle and posterior feet enlarged and lamellate with the dorsal cirri situated in a notch at its end; spinigers in the notopodia; 1-2 falcigers and spinigers in the neuropodia.

Distribution : Reported from South African estuaries, (Day, 1967). Reported from Mahanadi estuary (Julka & Rao 1976)

***Perinereis nigropunctata* (Horst, 1889)**

Material : 6 exs., Hukitola, Mangrove Forest, Paradeep; 10.2.90, C.N.R., 3 exs., Hukitola,

Mangrove Forest, Paradeep; 19.7.90, T.V.

Description : Specimens of 4-5 cms. proboscis with group VI-one large transverse paragnath on each side tentacular cirri elongated, notopodia and neuropodia bilobed with the dorsal lobe of the notopodia enlarged in the middle and posterior segments.

Distribution : Reported from Gangetic Delta & Chilka Lagoon.

Perinereis nuntia (Savigny, 1818)

Material : 3 exs., River-mouth, Paradeep; 07.12.1989; D.C.M., 1 ex., Battighar, Paradeep; 14.02.1990; C.N.R., 3 exs., Gangolia, Paradeep, 11.02.1990; C.N.R.

Description : Tentacular cirri elongated, proboscis with many small chitinous paragnaths arranged in a transverse line on Group VI; homogomph and heterogomph spinigers and ventral heterogomph falcigers with short-end pieces.

Distribution : Reported from Andaman Islands, Orissa Coast and Gulf of Mannar.

Family NEPHTYIDAE

Nephtys dibranchis Grube, 1877

Material : 1 ex., Devi river-mouth, Astaranga; 22.02.1990; C.N.R.

Description : Gills long and coiled inwards starting from 5th segment and are present in all segments except the last few; ventral rami cirri-form; bifurcate lyriform-setae in the ventral rami.

Distribution : Reported from coasts of Orissa, Visakhapatnam & Madras.

Nephtys oligobranchia Southern, 1921

Material : 1 ex., Chowmohan, Paradeep; 16.02.1989; T.V., 4 exs., Nuna Bridge, Paradeep; 13.02.1990; C.N.R.

Description : Specimens about 3 cm. in length, small lamellae shaped gills from 5th segments and disappear on 20-25th feet; long slender capillary setae with fine serrations on one side or their flattened tips.

Distribution : Reported from Gangetic Delta, Chilka Lagoon, Godavari Estuary and Cochin Back-waters.

Family EUNICIDAE

Diopatra neapolitans Delle Chiaje 1841

Material : 1 ex., Devi river estuary, Astaranga; 19.02.1990; C.N.R., 1 ex., Hukitola, Paradeep; 20.10.1990; C.N.R., 4 exs., River-mouth, Paradeep, 12.02.1989; T.V., 2 exs., Battighar, Paradeep; 28.07.1989; T.V.

Description : Specimens of varying sizes i.e. 1-9 cm. in length; enclosed in leathery tubes.

Distribution : All along the India coast, Estuaries and brackish waters with moderate salinity.

***Lumbriconeris tetraura* (Schmarda, 1861)**

Material : 1 ex., Devi river-mouth, Astaranga, 19.02.1990; C.N.R., 1 ex., Hukitola, Paradeep; 10.02.1990; C.N.R., 1 ex., Battighar, Paradeep; 14.02.1990; C.N.R., 1 ex., River-mouth, Paradeep; 11.02.1989; T.V.

Description : Cylindrical worms of about 4.5 cm. in length and flesh-brown in colour. Simple hooks and capillary setae in all feet, parapodial lobes un-equal; lingules of posterior feet not elongated and erect.

Distribution : Reported from Ganjam & Visakhapatnam coasts and Vellar Estuary.

Family GLYCERIDAE

***Glycera alba* (Muller, 1788)**

Material : 2 exs., Chowmohan, Paradeep; 16.02.1989; T.V., 3 exs., River-mouth, Paradeep; 11.02.1989; T.V., 4 exs., River-mouth, Paradeep; 08.04.1992; C.N.R.

Description : Narrow specimens of 3-4 cm.; small Branchia situated above the dorsal ramus; parapodia with two lobes in each ramus. Anterior lobes triangular and equal in size, while the posterior lobes un-equal with the ventral one round in shape.

***Glycera rouxi* Audouin & M. Edwards 1833**

Material : 1 ex., River mouth, Paradeep; 11.02.1989; T.V., 6 exs., Devi river-mouth, Astaranga, 20.02.1990; C.N.R.

Description : Specimens 8-10 cm. in length, dark brown in colour; lobe like retractile gills situated on the anterior side of the feet; parapodia with two triangular anterior lobes and two posterior lobes of which the lower one round in shape; papillae of the proboscis globular.

Distribution : Reported from Gangetic Delta, Orissa coast and Gulf of Mannar.

***Glycera longipinnis* Grube, 1878**

Material : 7 exs., Hukitola, Paradeep; 10.02.1990; C.N.R.

Description : Cylindrical specimens of 4-5 cm; Proboscis with soft Papillae: simple elongated branchia situated on the dorsal edge of the feet: dorsal cirri small; parapodia with 2 pointed anterior lobes and a single rounded posterior lobes; both simple and compound setae present.

Distribution : Godavari estuary, Bay of Bengal.

Family ORBINIDAE

Haploscoloplos kerguelensis (McIntosh, 1885)

Material : 1 ex. River mouth, Paradeep; 11.02.1989; T.V., 4 exs., Battighar, Paradeep; 05.12.1989; D.S.M., 4 exs., Battighar, Paradeep; 19.10.1990; C.N.R.

Description : Narrow specimens of about 2-4 cm. in length. Anterior thoracic region of 15-20 segments flattened and abdominal region round in shape; prostomium pointed; gills starting from 18-20th segments; only crenulate capillary setae; no hooks.

Distribution : Reported from Visakhapatnam coast only.

Family SPIONIDAE

Polydora caeca (Oersted, 1843)

Material : 10 exs., Devi river-mouth, Astaranga; 19.02.1990; C.N.R.

Description : Small and narrow specimen of 2 cm.; 5th segment modified with unidentate and un-hooded hooks without lateral spine; gills from 8th setigerous segments and bidentate hooded ventral hooks from 7th setiger; notopodia of the posterior feet with long dorsal capillaries and 3-4 small stout spines with blunt tips.

Distribution : Reported from Gulf of Mannar.

Family MAGELONIDAE

Magelona cincta Ehlers, 1908

Material : 1 ex., River mouth, Paradeep; 17.10.1990; C.N.R.

Description : Long and narrow specimen of about 4 cm. in length; prostomium scolex-shaped with a pair of elongated palps which have sucker-like papillae at their distal ends; another 9 segments with capillary setae on both rami which are lobe like; no special setae on 9th segment; from 10 segment onwards lamella shaped ligule on each ramus with bidentate hooded hooks; reddish-band not seen on 5-9th segment.

Distribution : Reported earlier from Godavari and Vellar estuaries.

Family OWENIIDAE

Owenia fusiformis Delle Chiaje, 1844

Material : 2 exs., River-mouth, Paradeep; 07.12.1989; D.S.M.

Description : About 5 cm. in length; first 3 segments very long and this part is equal to the remaining part of the body; 1st three segments only with capillary setae and the remaining segments with dorsal capillary setae and ventral bidentate uncini.

Distribution : Reported from Chandipur coast, Orissa, Portonovo waters and Tuticorin.

Family CAPITELLIDAE

Heteromastus similis Southern, 1921

Material : 10 exs., Devi river mouth, Astaranga; 13.02.1990; C.N.R., 30 exs., Hukitola, Paradeep; 20.10.1990; C.N.R., 10 exs., River mouth, Paradeep; 14.02.1992; C.N.R.

Description : Long specimens of about 10 cm. in length, first five thoracic segments with only capillary setae, remaining six segments with long stalked hooks; Abdomen long and strobiliform with shorter hooks situated on tori, gills not very clear.

Distribution : Orissa coast, Gulf of Mannar, Gangetic delta, Godavari & Vellar estuary.

Family AMPHARETIDAE

Isolda pulchella Muller, 1858

Material : 8 exs., Devi river-mouth, Astaranga; 19.02.1990 C.N.R.

Description : Small worms of about 2 cm.; buccal tentacles smooth and grooved; four pairs of gills of which 2 pairs are subulate and remaining two pinnate with short lateral branches; 13 uncinigerous thoracic segments, and about 30 abdominal segments with uncinigerous pinnules.

Distribution : This is the second report of the species from Indian waters. Earlier reported from Godavari Estuary.

Melinna aberrans Fauvel, 1932

Material : 2 exs., Devi river mouth, Astaranga; 17.02.1990; C.N.R., 5 exs., Devi river mouth, Astaranga; 26.10.1990; C.N.R.

Description : Specimens of 3 cm. enclosed in muddy tubes; Several smooth buccal tentacles; 4 pairs of subulate gills; a pair of large post-branchial hook on the 5th segment; thorax of 14 segments with dorsal capillaries and ventral uncini; abdomen of about 30-35 segments with uncinigerous pinnules.

Distribution : Visakhapatnam coast.

Amage bioculata (Moore, 1906)

Material : 8 exs., River-mouth Paradeep; 14.02.1992; C.N.R.

Description : Specimens about 3 cm. in length; 4 pairs of subulate gills and smooth buccal tentacles; 12-14 thoracic segments with dorsal capillary setae and ventral uncini; abdomen long with uncinigerous pinnules; palae or post branchial hooks absent.

Distribution : Earlier reported from off-shore waters of Puri, Orissa and Chilka Lagoon.

Family MALDANIDAE

Clymene (Euclymene) annandalei, Southern, 1921

Material : 3 exs. Devi river-mouth, Astaranga; 20.02.1990; C.N.R.

Description : Body of 21 segments of about 6-7 cm. with coloured bands anteriorly; cephalic-plate crenulate posteriorly; anterior three segments with a single ventral acicular hook and the remaining segments with several acicular setae situated on ventral tori, pygidium funnel shaped with sunken anal cone.

Distribution : Chilka lagoon, Gangetic delta and Vellar Estuary.

Family TERESELLIDAE

Loimia medusa (Savigny, 1820)

Material : 4 exs., Devi river, Sunadhara; 13.02.1989; T.V., 1 ex., Devi river-mouth, Astaranga, 17.02.1990; C.N.R.

Description : Large and stout specimens of 8-10 cm. in length; 3 pairs of arborescent gills and several grooved tentacles with coloured bands; thoracic segments with capillary setae and uncini while abdominal tori with uncinigerous pinnules; ventral pads in the anterior region; body enclosed in thick muddy tubes.

Distribution : Gangetic Delta, Chilka Lagoon, Orissa Coast, Gulf of Mannar and Bay of Bengal.

Terebella ehrenbergi Grube, 1870

Material : 1 ex. Hukitola, Paradeep; 10.02.1990; C.N.R.

Description : About 4 cm. in length; several long coiled tentacles; 3 pairs of arborescent gills; dorsal setae present on all segments except the last few; first 20 segments with simple capillaries and in the remaining segments, capillary setae with their broad ends pectinate and twisted; ventral uncini in double rows.

Distribution : This is the first report of this species from estuarine waters. Earlier reported from Gulf of Mannar.

Family SABELLIDAE

Laonome indica Southern, 1921

Material : 3 exs., Battighar, Paradeep; 19.10.1990; C.N.R.

Description : About 2-3 cm. and very narrow specimens enclosed in thin muddy tubes; body divided into thorax of six segments and long abdomen of several segments; thoracic segments with dorsal capillaries and short spatulate setae; ventral uncini; abdomen with dorsal uncini and ventral capillary setae.

Distribution : Gangetic Delta, Chilka Lagoon and Vellar estuary.

DISCUSSION

The present study on polychaete material of about 600 specimens resulted in the identification of 33 species belonging to 25 genera comprising 15 families. Based on the distribution of polychaetes in the estuary i.e. from upper reaches to the mouth region and season of occurrence, since seasonal changes bring about marked salinity fluctuations, the polychaetes from the estuary are grouped into 3 categories viz. estuarine, euryhaline marine and marine forms.

Estuarine forms : These are purely estuarine and occur all over the estuary and rarely available from marine zone and sea. Polychaete species, *T. annandalei*, *E. barantollae*, *D. heteropoda*, *D. aestuarina*, *D. arborifera*, *N. fauveli*, *N. (N) chingrighattensis*, *N. (N) glandicineta*, *N. oligobranchia* and *L. indica* comes under this category.

Euryhaline marine forms : These are of marine origin but capable of tolerating and even preferring salinity fluctuations, thus inhabiting various localities of the estuary as well as in marine waters though less frequently. This group comprises the major component among the estuarine polychaetes. The polychaetes species viz. *N. indica*, *T. bogoyawlenskyi*, *N. (N) succinea*, *P. migropunctata*, *P. nuntia*, *D. neapolitana*, *L. tetraura*, *G. alba*, *H. similis*, *L. medusa*, *C. (E) annandalei* and *M. aberrans* are grouped into this category.

Marine forms : These are purely marine and enter into the estuary/gradient zone only when salinity is high. Species viz. *E. (E) sanguinea*, *G. longipinnis*, *N. dibranchis*, *H. kerguelensis*, *P. caeca*, *M. cincta*, *O. fusiformis*, *I. pulchella*, *A. bioculata*, *T. ehrenbergi* comes under this group as these are reported from marine waters and occurring in estuarine areas at time of high salinity. Among the above three categories it is rather difficult to differentiate estuarine forms from euryhaline ones in case of certain species, however the marine forms could be recognised as they occur not frequently in estuaries and present at gradient zone/times of high salinity only.

The occurrence of *T. annandalei* in large numbers from several localities of the Mahanadi estuary in the present study is significant since this species was reported once from Baitarani estuary (Soota & Rao, 1977) and Gangetic Delta (Misra *et al.* 1983) after its discovery from Talah-Sap, Thailand (Fauvel, 1932). The report of the uncommon *N. (N) succinea*, *M. cincta* and *I. pulchella* is of interest in the distribution of polychaetes as this is the second report of the occurrence of these species from Indian waters. Polychaete species viz. *T. bogoyawlenskyi*, *H. kerguelensis*, *G. longipinnis*, *M. aberrans*, *P. caeca*, *A. bioculata*, *M. cincta*, *I. pulchella* and *T. ehrenbergi*, are being reported first time from the coastal waters of Orissa.

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PORIFERA

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INTRODUCTION

In order to make an update account of the Sponge fauna of Mahanadi Estuary, Orissa various extensive surveys were undertaken during the period from 1989 to 1992 to cover thoroughly the entire areas of the Estuary. Mahanadi river has three mouths to open into the sea, at Paradeep, Hukitola and Astaranga (mouth of Devi river, a branch of Mahanadi). All the above mentioned mouth regions and upto to zone of tidal effect of the estuary are either sandy or muddy or mixture of sand and mud. During the course of surveys of the Estuary, only two species of sponges boring to molluscan shells, were collected from Hukitola and Paradeep.

There are several works on boring sponges of Indian seas, estuaries and brackish water lakes like Carter (1880), Dendy (1905), Annandale (1915, 1915a, 1915b), Burton (1937), Thomas (1970, 1972, 1975, 1979, 1980 and 1985). There is no work on sponges of Mahanadi Estuary. The present account deals with sponges of Mahanadi Estuary which is a new record from the locality.

SYSTEMATIC ACCOUNT

Phylum PORIFERA

Class DEMOSPONGIAE Sollas

Subclass TETRACTINOMORPHA Levi

Order HADROMEKIDA Topsent

Family CLIONIDAE Gray

Cliona vestifica Hancock, 1849

Cliona vestifica Hancock, 1949, p. 342.

Cliona vestifica Thomas, 1985, p. 318, pl. VI, fig. 13

Material examined : One lot, Hukitola, 9.3.1992, coll. J. G. Pattanayak.

Description : Boring on molluscan shells, opening on the shells very small, .5-1 mm, arranged irregularly; colour grey in dry specimen; chambers found inside the shell different in shape and pores .5-1 mm in diameter and .5-2 mm apart.

Megascleres – (1) Tylostyles straight and sharply pointed, head spherical, 0.135-0.256 mm in length and 0.001-0.004 mm in width. (2) Oxeas microspined and sharply pointed, 0.05-0.125 mm in length and 0.001-0.003 mm width.

Microscleres – (1) Spirasters with 3-6 angulations spines more prominent at the angular region or granulated throughout or even smooth; 0.007-0.012 mm in length and 0.001-0.002 mm in width.

Indian distribution : Chilka Lagoon, Gulf of manner, Mahanadi Estuary, Minicoy Island, Zuary and Mandovi Estuary.

General distribution : Cosmoplital

Remarks : This species is widely distributed throughout the world. Its power of salinity tolerance is very high and hence very commonly found in estuaries. This species is recorded for the first time from Mahanadi Estuary.

***Donotella acustella* (Annandale, 1915)**

Cliona acustella Annandale, 1915 a, p. 14, fig. 2.

Donotella acustella de Laubenfels, 1936, p. 156.

Donotella acustella, Thomas, 1979, p. 170, fig. 5, A.

Material examined : One lot, Paradeep, 5.3.1992, Coll. J. G. Pattanayak.

Description : Boring on oyster shells, opening on shells small and irregularly scattered, 0.5 mm in diameter; chambers inside the shell subcircular and 1-1.5 mm in diameter.

Megascleres – Oxeas smooth, uniformly curved and sharply pointed, 0.125-0.182 mm in length and 0.005-0.008 mm in width.

Microscleres – streptasters with spines, very thick, 0.01-0.015 mm in length and 0.007-0.01 mm thick.

Indian distribution : Ganjam coast, Orissa; Mahanadi estuary.

General distribution : Bay of Bengal.

Remarks : Annandale (1915 a) first described the species from Ganjam coast, Orissa. After that the species is not recorded from any where in Indian region. This is the first record of the species from Mahanadi Estuary.

SUMMARY

Results of the study of Sponges of Mahanadi Estuary, Orissa for the period from 1989 to 1992 are reported. Two species of boring sponges *Cliona vestifica* Hancock (1949) and *Donotella acustella* (Annandale, 1915) are reported from the molluscan shells. This is the first record of the species from Mahanadi Estuary.

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OTHER GROUPS

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INTRODUCTION

During various extensive surveys of Mahanadi Estuary from 1989 to 1992 efforts were made to have a good account of collections of estuarine fauna. Systematic studies of all the groups of animals are dealt with in different chapters except the Phyla Coelenterata, Echinodermata and order Hirudinea of the Phylum Annelida, class Arachnida and order Testudines of class Reptilia.

39 specimens under phylum Coelenterata are identified upto genus level, one specimen of Phylum Echinodermata is identified upto species level and two others upto generic level. One specimen of order Hirudinea of Phylum Annelida is identified upto species which is a new record from Mahanadi Estuary. One specimen under class Arachnida is identified upto genus only and one specimen under order Testudines is identified upto species.

Practically there is no significant work on the groups mentioned above of Mahanadi Estuary. But the major contemporary works on those groups of Indian region are Daniel (1974), Daniel (1985) on siphonophora of coelenteratae; Bhatia (1939), Chandra (1983), Harding and Moore (1927), Sanjeeva Raj (1976), on Hirudinea; Clark, Koehler and Vaney (1899-1927), Clark and Clark (1967), Clark and Row (1971) and James (1987) on Echinodermata; Jangi (1966), Jangi and Dass (1984) on Scholopendromorpha; Smith (1931), Tikader and Sharma (1985) on Testudines.

SYSTEMATIC LIST

Phylum COELENTERATA

Class ANTHOZOA

Order ACTINIARIA

Family EDWARDSIIDAE

Edwardsia sp.

Material : 30 exs., Astaranga, near Devi river mouth, 20.2.1990, Coll. C.A.N. Rao & Party.

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Order PENNATULACEA

Family PENNATULIDAE

Pennatula sp.

Material : 2 exs., Astaranga, near Devi river mouth, 20.2.1990, Coll. C.A.N. Rao & Party.

Class HYDROZOA

Order SIPHONOPHORA

Family PORPITIDAE

Porpita Sp.

Material : 7 exs., mouth of Mahanadi at Paradeep, 8.2.1990, Coll. C.A.N. Rao and Party.

Phylum ANNELIDA

Class CLITELLATA

Order HIRUDINEA

Suborder RHYNCHOBDELLAE

Family ICHTHYOBDELLIDAE

Pontobdella aculeata Harding

Material : One example; Saptapaniya area, near Ashtaranga, Devi river; 23.11.1990; Coll. D. S. Mathur and Party.

Remarks : This species is recorded for the first time from Mahanadi estuary.

Phylum ECHINODERMATA

Class ASTEROIDEA

Order PAXILLOSIDA

Family ASTROPECTINIDAE

Astropecten sp.

Material : 2 exs., Ashtaranga, Near Devi river mouth 3.8.1989, Coll. T. Venkateswarlu & Party; 1 ex., Ashtaranga, near Devi river mouth, 20.2.1990, Coll. C.A.N. Rao & Party.

Phylum ECHINODERMATA

Class ECHINOIDEA

Order TEMNOPLEROIDA

Family TEMNOPLEURIDAE

Temnopleurus toreumaticus (Leske)

Material : 1 ex., Ashtaranga, near Devi river mouth, 3.8.1989, Coll. T. Venkateswarlu and Party.

Phylum ARTHROPODA

Class ARACHNIDA

Order SCOLOPENDROMORPHA

Family SCOLOPENDRIDAE

Trachycormocephalus sp. (Juvenile)

Material : 1 ex., Batighar near Paradeep, 19.3.1991, Coll. T. Venkateswarlu and Party.

Phylum CHORDATA

Class REPTILIA

Order TESTUDINES

Suborder ATHECAE

Family EMYDIDAE

Kachuga tentoria (Gray)

Material : 1 ex., Luna bridge, Mahanadi river, 16.2.1989, Coll. T. Venkateswarlu and Party.

SUMMARY

The present paper deals with the groups of animals collected during various extensive surveys of Mahanadi Estuary undertaken from 1989 to 1992 which are not dealt with in other chapters. These comprise of 3 species under Phylum Coelenterata, 2 species under Phylum Echinodermata, 1 species under order Hirudinea of Phylum Annelida being a new record from Mahanadi Estuary, 1 species under class Arachnida and 1 species belonging to order Testudines of class Reptilia.

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