

# Assessment of Plankton Diversity of Mahanadi River at Jobra and Sikharpur, Cuttack

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**Abstract**—The present study was carried out in Environmental Science laboratory of Zoology Department of Ravenshaw University, Cuttack from Jan-July 2013. The work carried out is an attempt to study the status of largest Eastern belt River Mahanadi with the help of planktons. Basic water quality parameters like pH, Dissolved oxygen, Carbon dioxide, Total Hardness, Phosphate and Orthophosphate were determined as per Standard methods APHA. Arthropodan zooplanktons were observed and recorded from both the Stations followed by Rotifers. Phytoplanktons belonging to *Bacillariophyta* dominated Jobra and Sikharpur waters and many *Chlorophyta* have been recorded at both the Stations.

**Index Terms-** Zooplanktons, Phytoplanktons, Jobra, Sikharpur

## 1 INTRODUCTION

Planktons (“planao” means to wander) are minute floating organisms, usually found in surface water. They are broadly divided into phytoplankton (plants category) and zooplankton (animal category). Zooplanktons are distinguished from phytoplankton on the basis of morphology and mode of nutrition. Phytoplankton contain chlorophyll for synthesis of food where as zooplanktons cannot directly convert solar energy to chemical energy. Freshwater zooplanktons are used as bioindicators. Zooplanktons are important components of aquatic ecosystem and function as primary and secondary links in the food chain. They act as grazers and as food source for other invertebrates and fish.

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They also help in regulating the population of phytoplankton by feeding on them.

## 2 STUDY AREA

This study was carried out at two different locations around the city from the month of January 2013 to July, 2013. The field of study was Jobra (station 1), Sikharpur (station 2).

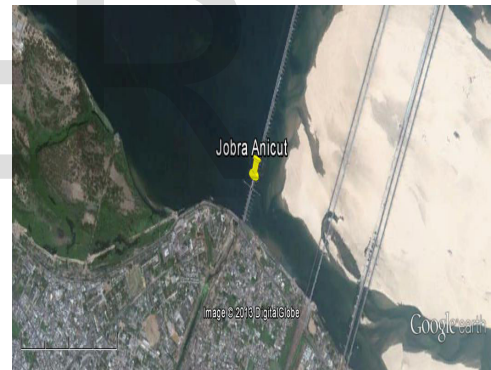


Plate 1 Jobra Sampling Station

## 3 MATERIALS AND METHOD

Samplings were done during day time between 10 am to 2 pm. The planktons were collected with the help of plankton net by putting the net directly into the surface water. Planktons were also collected from the river with the help of a bucket with inversion of water filled bucket into the plankton net. The samples were transferred into the collection tubes and 4% formalin (2ml formalin per 10ml sample) was added to the collected sample for preservation.. After preservation 8 to 10 drops of Rose bengal stain was added to the sample (10ml of sample) bottles. DPX was used for preparing permanent slides and the prepared slides were observed under compound microscope at magnification of 10x and 40x. The water samples collected separately was examined in the laboratory to check

the physico-chemical parameters like dissolved oxygen, free carbon dioxide, total phosphate, total hardness, calcium and orthophosphate content. Water

quality tests were conducted as per Standard methods APHA.

#### 4 RESULTS AND DISCUSSION-

		Jan	Feb	Mar	Apr	Jun	Jul
<b>DO</b>	St-1 Jobra	6.8	5.09	7.25	7.28	3.58	2.48
	St-2 Sikharpur	7.12	7.36	6.09	7.55	3.31	3.33
<b>CO<sub>2</sub></b>	St-1 Jobra	3.09	4.01	3.00	3.10	8.29	8.51
	St-2 Sikharpur	3.12	3.11	3.09	3.08	4.67	5.33
<b>Total Hardness</b>	St-1 Jobra	60.03	58.99	52.28	49.04	57.33	63.67
	St-2 Sikharpur	50.03	46.22	43.89	64.66	61.82	70.18
<b>Calcium</b>	St-1 Jobra	11.99	9.86	9.00	18.52	6.53	6.91
	St-2 Sikharpur	9.23	11.54	10.29	12.06	7.60	6.6
<b>Total Phosphate</b>	St-1 Jobra	1.9	2.8	3.1	2.1	0.9	2.9
	St-2 Sikharpur	1.2	2.5	2.5	3.0	1.9	2.1
<b>Ortho phosphate</b>	St-1 Jobra	0.3	1.9	0.8	1.0	0.2	1.9
	St-2 Sikharpur	0.9	1.2	1.2	1.6	0.3	0.9
<b>pH</b>	St-1 Jobra	8.1	7.7	7.2	8.8	7.7	7.7
	St-2 Sikharpur	8.0	7.9	7.6	10.5	8.1	8.5

Table. 1 Water quality indices

Phylum	Premonsoon		Monsoon	
	St-1	St-2	St-1	St-2
Arthropoda	83	69	77	43
Rotifera	27	37	28	45
Bryozoa	0	0	0	0
Mollusca	01	01	14	0
Nematoda	23	23	16	36
Total	134	130	135	124

Table.2 Total population of different phylum at different stations

Phylum	Genus	Pre-Monsoon		Monsoon	
		St-1	St-2	St-1	St-2
<i>Arthropoda</i>					
	<i>Cyclopod</i>	31	22	29	11
	<i>Heliodiaptomus</i>	33	19	11	07
	<i>Nauplii</i>	08	10	15	-
	<i>Alona</i>	14	17	09	15
	<i>Bosminopsis</i>	08	-	21	02
	<i>Ephemeropterus</i>	06	-	-	05
	<i>Moina</i>	05	01	-	03
<i>Rotifera</i>	<i>Brachionus falcatus</i>	-	10	21	14
	<i>Brachionus quadridentatus</i>	-	02	-	19
	<i>Euchlanis</i>	-	03	-	02
	<i>Lecane</i>	02	-	01	01
	<i>Plationus patulus</i>	25	17	06	09
<i>Bryozoa</i> ( <i>Cyphonautes larvae</i> )	----	-	-	-	-
<i>Mollusc</i> ( <i>Zoea larvae</i> )	-----	01	01	14	-
<i>Nematode</i>	-----	02	23	16	36

Table 3. Population and distribution of zooplankton species at St-1, St-2 during premonsoon and monsoon season.

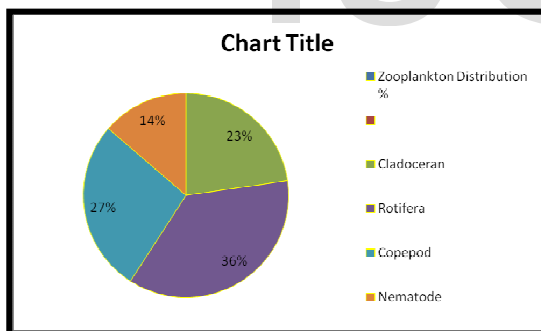


Fig. 1 Distribution of Zooplanktons

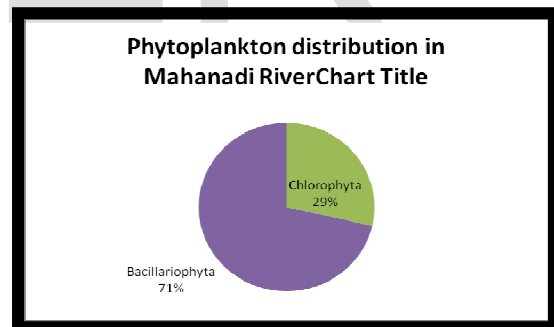


Fig.2 Distribution of Phytoplanktons



Plate 2.1 *Volvox*



Plate 2.2 *Spirogyra*



Plate 2.3 *Cylindrospermum*



Plate 2.4 *Botryococcus*



Plate 2.5 *Fragilaria*



Plate 2.6 *Actinastrum*

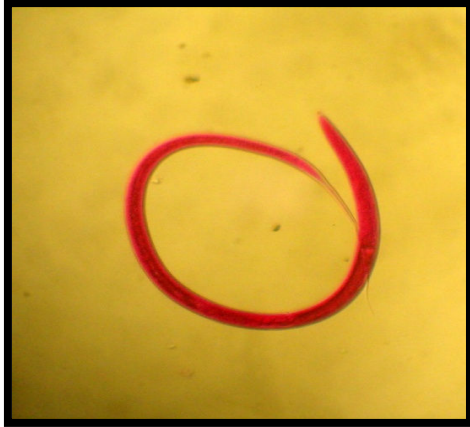


Plate 2.7 Nematode



2.8 *Heliodiaptomus* sp.

Plate



Plate 2.9 *Brachionus* sp.

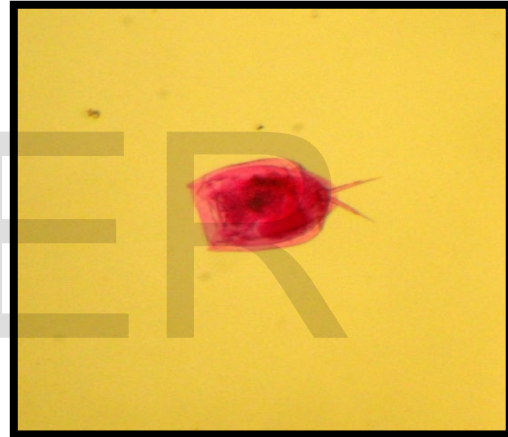


Plate 2.10 *Lecane* sp.



Plate 2.11 Crab zoea larva



Plate 2.12 Cyclopoid

Present investigation has confirmed presence of species like *Spirogyra*, *Nauplius larva*, *Synedra*, *Navicula*, *Phormidium*, *Oscillatoria* at Jobra and Sikharpur. Presence of mixed planktons indicates that the pollution load of River Mahanadi is moderate to high during summers and the load decreases in the rainy season due to dilution. The zooplankton community of the river is composed of helminth larva, cladocera and copepod. Concentration of helminth larva is more during rainy season due to runoff of faecal matter from residential area into the river. *Cladocerans* have also been reported from River Mahanadi and they prefer to reside in clean waters. Similar work has been reported by Goswami et al (2012) on Zooplankton of Fresh Water Reservoir Nyari – II Rajkot district, Gujarat, India and observed that the zooplankton were represented by various phyla like, protozoa, helminthes, rotifera, annelida, arthropoda etc.

Arthropods have been reported maximum in number of varieties and percentage amount in the total zooplankton followed by Rotifer in general. Plankton population depends on chemistry of water, temperature and amount of suspended matter. The results reflected in the present investigation is supported by similar results with regard to Rotifer population abundance in the non polluted region than in polluted region in tropical ponds of Srilanka (Patrick et al., 2012). Mathivanan et al., (2007) carried out research work on plankton population with reference to pollution on Cauvery river water, Salem district, Tamil Nadu Uncontrolled domestic wastewater and sewage discharge into the water body can result in the eutrophication as evidenced by substantial algal blooms and dissolved oxygen depletion in River Mahanadi.

## 5. REFERENCES

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