



Zooplankton Diversity from Godavari River Water (Maharashtra)

KEYWORDS

Godavari River Water, Water quality, zooplankton diversity.

Satish. S. Patil

Ishwar. B. Ghorade

Department of Environmental Science Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431 004. M.S. India.

Department of Environmental Science Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431 004. M.S. India.

ABSTRACT

The zooplankton samplings on monthly basis were carried out for a period of two years from 2010 to 2012 from Godavari River water. Standard keys and other literature were used for identification of different species. Four major groups of zooplankton (Rotifera, Copepoda, Cladocera and Ostracoda.) were studied for diversity and seasonal abundance. Among the groups of zooplanktons, the population density showed variations due to their adaptability to seasonal changes in water quality. Some zooplankton population disappeared at a specified period and reappeared during other period. This disappearance may be due to the fact that some species occur in spores, under favorable conditions spore germinate and appear as zooplankton. Assessment of river water bodies with reference to species diversity of zooplankton was done in three different seasons' summer, monsoon and winter.

INTRODUCTION

Water is one of the most natural resources for all the living organisms, weather unicellular or multi cellular, since it is required for various domestic purposes irrigation, shipping, power generation and industries (Patil & Ghorade., 2012). The man's influence on these water bodies caused by rapid cutting of surrounding vegetation, thus increasing silt and nutrient load, disposal of sewage and industrial waters, use for defecation, cultural activities, and agriculture chemicals greatly increased the quantity of nutrients and organic input into a water body (Patil. 2011). Considering ecological, economical and recreational promise of the water body, present work was undertaken to assess seasonal diversity and population density of zooplankton. In the present study attempt was made to study eco-sustainability assessment of Godavari river water flowing in Maharashtra from Nasik to Nanded by studying zooplankton quantification and their seasonal abundance and their seasonal diversity to indicate the sustainability of water from drinking point of view.

MATERIAL AND METHODS

Survey of Godavari river water bodies was carried out to assess the zooplankton quantification and their seasonal abundance for their seasonal diversity to indicate the sustainability of water quality at different stations of upper and lower Godavari to know the present status of Water Quality. Nearly of about 12 sampling stations were selected after survey such as Trimbakeshwar-S1, Downstream of Ramkund at Nasik bridge-S2, Niphad-S3, Kopergaon Bridge-S4, Nandur - Madhemeshwar Dam-S5, Kaygaon Toka-S6, Jaikwadi Dam-S7, Kholi Naka-S8, Shahgad Bridge-S9, Dhargar Takli-S10,

Vishnupuri Dam at Nanded-S11 and Rawer-S12, from upper Godavari and lower Godavari river basin approximately at the distance of 50 km, as per the guidelines of Maharashtra Pollution Control Board and Central Pollution Control Board. The identification of zooplanktons was carried out in the research laboratory. The survey of Godavari river water is carried out with references to species diversity of zooplanktons such as location, nature of catchment area and main human activities. The zooplankton sampling on monthly basis was carried out for a period of two years from 2010 to 2012 from Godavari river water. For qualitative analysis a compound microscope was used. As far as possible, the animals were identified to the species level. Preliminary identification was made by using standard monographs and published research papers (Chandrashekhar & Kodarkar., 1995, Kumar & Paul., 1990, Patil., 2011) the taxonomic key (Murugan., 1989) and a taxonomic manuals of freshwater invertebrates (Edmondsoan., 1965, Pennak Rabert., 1989, Ward., 1954,) and other regional publication (Dahnpati., 1974) as basic reference.

RESULTS AND DISCUSSION

Four major groups of zooplankton (Rotifera, Copepoda, Cladocera and Ostracoda) were studied the diversity and seasonal abundance. Zooplanktons like 7 species of Rotifera (Brachionus falcatus, Branchionus diversicornis, Echlans dilatata, Filinia terminalis, Keratella tropica, Keratella quadrata, Testudinella mucronata), 4 species of Copepoda (Diaptomus, Mesocyclops edox, Napulli, Paracyclops affinis), 5 species of Cladocera (Daphnia rosea, Cerodaphnia quadrangular, Moina brachiata, Alona affinis, Cerodaphnia reticulata) and 1 species of Ostracoda (Cypris) were identified (Table 1).

TABLE-1: Seasonal Variation in zooplankton's (per ml) at different stations along the bank of Godavari River from Maharashtra (2010-2012).

Zooplanktons	S1			S2			S3			S4		
	S	M	W	S	M	W	S	M	W	S	M	W
Rotifera	4 36.36%	5 33.33%	4 21.05%	7 30.43%	6 27.27%	6 24.0%	8 47.06%	7 31.81%	5 26.31%	8 37.10%	6 24.0%	5 21.74%
Copepoda	3 27.27%	3 20.0%	5 31.57%	4 17.39%	3 13.63%	3 12.0%	2 11.76%	5 22.72%	4 21.05%	3 14.28%	2 10.0%	4 17.39%
Cladocera	2 18.18%	3 20.0%	5 31.57%	6 26.08%	5 22.72%	7 28.0%	3 17.64%	6 27.27%	5 26.31%	6 28.57%	7 35.5%	7 30.43%
Ostracoda	2 18.18%	4 26.26%	5 31.57%	6 26.08%	8 36.36%	9 36.0%	4 23.52%	4 18.18%	5 26.31%	4 19.05%	5 25.0%	7 30.43%
Total	11	15	19	23	22	25	17	22	19	21	20	23

Zooplanktons	S5			S6			S7			S8		
Seasons	S	M	W	S	M	W	S	M	W	S	M	W
Rotifera	10 37.04%	6 24.0%	8 30.1%	11 36.66%	9 42.85%	13 44.52%	14 56.0%	9 37.5%	12 38.71%	8 40.0%	7 35.0%	6 35.37%
Copepoda	4 14.81%	3 15.0%	3 41.29%	6 20.0%	5 23.81%	5 17.20%	3 12.0%	5 20.83%	6 19.35%	4 2.0%	3 15.0%	3 17.69%
Cladocera	6 22.22%	5 25.0%	4 19.05%	5 16.66%	2 9.52%	3 10.34%	6 24.0%	7 29.16%	7 22.58%	6 3.0%	7 35.0%	6 35.29%
Ostracoda	7 25.92%	6 24.0%	6 28.57%	9 30.0%	6 28.57%	8 27.68%	2 8.0%	3 12.05%	6 19.35%	2 10.0%	3 15.0%	2 11.76%
Total	27	20	21	30	21	29	25	24	31	20	20	17

Zooplanktons	S9			S10			S11			S12		
Seasons	S	M	W	S	M	W	S	M	W	S	M	W
Rotifera	7 33.33%	8 40.0%	7 35.0%	9 39.13%	8 47.06%	8 42.11%	13 40.63%	11 35.48%	9 30.0%	6 30.0%	7 36.84%	7 33.33%
Copepoda	4 19.05%	3 15.0%	4 20.0%	6 26.09%	4 23.53%	4 2.53%	7 21.88%	6 19.35%	7 23.33%	4 20.0%	2 10.53%	6 28.57%
Cladocera	5 23.81%	6 30.0%	6 30.0%	4 17.39%	2 11.76%	3 15.79%	4 12.05%	5 16.13%	5 16.66%	6 30.0%	7 36.84%	4 19.05%
Ostracoda	5 2.81%	3 15.0%	3 15.0%	4 17.39%	3 17.65%	4 21.05%	8 25.0%	9 29.03%	9 30.0%	4 20.0%	3 15.79%	4 19.05%
Total	21	20	20	23	17	19	31	31	30	20	19	21

(S1 to S12= Station 1 to Station 12).

(S = Summer, M = Monsoon, W = Winter).

Population of total zooplankton increased in monsoon due to dilution effect and favorable environmental conditions like moderate temperature and abundance of food (Particulate matter and fine detritus). Component wise population density studies revealed that winter population of two groups Rotifera and Cladocera were highest while Ostracoda was the lowest. Availability of particulate matter was the main contributing factor in case of Ostracoda in winter.

Among the groups of Zooplanktons, the population density showed variations due to their adaptability to seasonal changes in water quality, availability to food and predatory pressure. The degradative influence is mainly exerted by untreated domestic sewage at many stations and its diversion to downstream by a bypass line could result nutrient enrich-

ment and consequent eutrophication.

The diversity specially the seasonal density of different zooplankton components at different locations along the Godavari river bed indicated a characteristics pattern peculiar to water bodies in urban environment. Such aquatic ecosystems invariably receive large volumes of untreated domestic sewage that ensures a sustained supply of nitrates, BOD and COD remained more or less uniform (Patil., & Ghorade., 2011). Factors like temperature, transparency, turbidity, conductivity and dissolved oxygen plays an important role in regulating diversity and seasonal population densities due to dilution effect and in monsoon and winter water quality that control the zooplankton population (Patil, 2011). In summer, the biotic interactions operating through predation and feeding efficiencies, linked to the size particulate food material that has controlling influence.

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