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A Study on Monthly Variations in Distribution and Diversity of Cladocera Population in Godavari River Water

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ABSTRACT

The current study deals with the monthly variations in the distribution and diversity of Cladocera population in Godavari river water from four different sampling sites (SS) during May 2009 to April 2010. Total six species of Cladocera belonged to six different families and genera were observed during study period. Highest Cladocera populations were recorded in July at sampling site 1.

KEYWORDS : monthly variations, distribution and diversity, Cladocera, Godavari river

INTRODUCTION

Zooplanktons are represented by taxonomic group of Rotifera, Cladocera, Copepod and Ostracoda. Among zooplanktons Cladocera is an ancient group of Palaeozoic origin (Forro et al, 2008). They are found in almost all kind of aquatic habitats. Cladocerans are tiny aquatic crustaceans and popularly called as "water flea" prefers to live in deep water and constitute a major item of food for fish. They mostly include microzooplanktons with the exception; almost all cladocerans vary in the size from 0.2 to 6 mm About 600 species of fresh water cladocerans have been reported (Korovchinsky, 1996) to occur throughout the world and in India 110 species have been recorded (Patil and Goudar, 1989).

Studies on cladocerans in different parts of India have been earlier carried out by several researchers (Sinha and Khan 2000, Sivakumar and Altaff 2004, Sharma and Sumita 2011, Sharma et al, 2012).

The studies on cladocera from Godavari river is deficient or remarkably sparse. Therefore, the objective of the present study was to inspect the cladocera diversity in river Godavari throughout different months during the period May 2009 to April 2010 in order to evaluate the distribution and population density along with seasonal variations of this faunal group.

MATERIALS AND METHODS

I. Sampling sites: Four sampling sites (SS) were selected namely, downstream of Gangapur dam (SS 1), Near Someshwar Temple (SS 2), Ramkund (SS 3) and Tapovan (SS 4) to study the monthly composition and diversity of the cladocera population in Godavari river, Nashik, Maharashtra.

II. Cladocera sampling: Godavari river water samples from four sampling sites were collected for qualitative and quantitative analysis of cladocera over a period of one year (May 2009 to April 2010) in between 7 a.m. to 10 a.m. by standard methods (APHA, 1985). The collected samples were fixed in 4% formalin and brought to the laboratory for cladocera analysis; counting and identification were done as per Battish (1992). For quantitative estimation Sedgwick – Rafter cell method was used.

RESULTS AND DISCUSSION

Table 1 represents list of cladocera species recorded in Godavari river. The pattern of cladocera analysis and monthly variation at four sampling sites of Godavari river are given in table 2 and figure 1. Figure 2 represents annual average percentage composition of cladocera at four studied sampling sites.

Cladocera abundance and species number in Godavari river varied monthly. The Cladoceran population identified from Godavari river during the present study (May 2009-April 2010) were represented by 6 species belonging to 6 genera and 6 families; Sididae, Daphniidae, Moinidae, Bosminidae, Macrothricidae, and Chydoridae.

TABLE - 1 LIST OF CLADOCERA SPECIES RECORDED FROM FOUR DIFFERENT SAMPLING SITES OF GODAVARI RIVER FROM MAY 2009 TO APRIL 2010.

Sr. No.	Cladocera Species	SS 1	SS 2	SS 3	SS 4
1	*Bosmina longispina*	+	+	+	+
2	*Chydorus sp.*	+	+	+	+
3	*Ceridaphnia cornuta*	+	+	+	+
4	*Microthrix spinosa*	-	+	+	+
5	*Moina micrura*	+	+	+	+
6	*Diaphanosoma sp.*	+	-	+	+

(+) = Present and (-) = Absent

At SS 1, the maximum population density recorded in July month 107 units/L and in November and December no species of cladocera were observed. At SS 2, the maximum population density recorded in April month 105.5 units/L and from October to December no species of cladocera were recorded. "At" SS 3, maximum density of cladocera 97.5 units/L was observed in September and less number of population density was recorded 12 units/L in December. At SS 4, population density of cladocera 78 units/L was highest in March month and in October and December no species were recorded.

Annual average percentage composition of cladocera was 71.55 units/L, 47.72 units/L, 55.21 units/L, and 39.25 units/L at four studied sampling sites 1, 2, 3, and 4 respectively.

TABLE - 2 POPULATION COMPOSITION AND MONTHLY VARIATION IN CLADOCERA (UNITS/L) AT FOUR DIFFERENT SAMPLING SITES OF GODAVARI RIVER (MAY 2009 TO APRIL 2010).

Month	SS 1	SS 2	SS 3	SS 4
May	66	44.5	49.5	24.5
June	100.5	28	49	28.5
July	107	45	34	24
August	53.5	12	74.5	20.5
September	53.5	24	97.5	52
October	83.5	-	79.5	-
November	-	-	29	29
December	-	-	12	-
January	49.5	45	74.5	36.5
February	82	73.5	46	50
March	40	52	24	78
April	80	105.5	93	49.5
Average	71.55	47.72	55.21	39.25

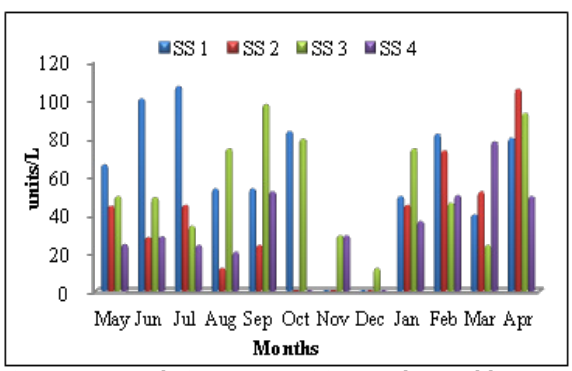

Figure 1: Population composition and monthly variation of Cladocera at sampling sites 1, 2, 3 and 4 (units/L) from May 2009 to April 2010.

Tropical water bodies typically contain genera *Moina, Ceriodaphnia, Macrothrix* and *Diaphanosoma* all of which are predominantly herbivorous taxa (Dodson and Frey 2001). These four genera of tropics were also recorded in the Godavari river during the present study at selected sampling sites.

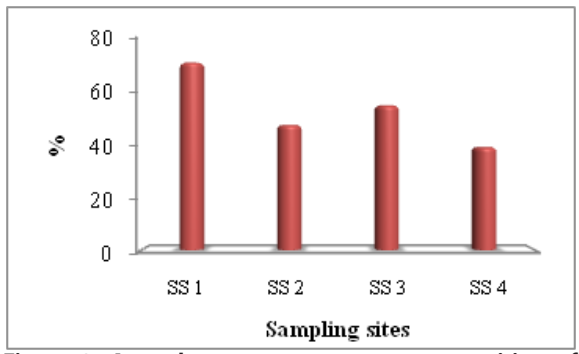

Figure 2: Annual average percentage composition of Cladocera at sampling sites 1, 2, 3 and 4 (May 2009 to April 2010).

The results of the present study indicate that, the maximum number of cladocera genera occurred during summer than in post-monsoon at some places that can be correlated with water level/cover. Quadri and Yousuf (1978) have also reported that the temperature is the primary factor affecting the occurrence and distribution of cladocerans and may be the minimum population of cladoceran in post-monsoon may be attributed to the dilution factor. Density and biomass of cladocerans is primarily determined by food supply (Wright 1954; Singh 2000), with increasing temperature in summer the food supply in the form of algae, detritus and bacteria is obtainable which leads to rise in population of cladocerans. The effect of temperature on cladocerans has implication from the viewpoint of species distribution, body size and abundance (Stockwell and Johannsson 1997). Occurrence of fewer predators in summer season may be the reason for higher density of cladocera (Shivashankar and Venkataramana 2013). During the present study moderate diversity of cladocera recorded in winter moreover totally absent in October, November, and December months may be due to seasonal fluctuation and effect of water parameters.

CONCLUSIONS

From the present study it was concluded that, variation in cladoceran population occurs throughout the study period (May 2009-April 2010). Higher or less density and diversity of cladoceran population at a particular study site in a particular season might be due to the favorable/unfavorable environmental conditions, and availability of food.

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