

Copepods from few freshwater bodies of periurban areas of South Chennai

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ABSTRACT

We proposed to study the occurrence of copepods on par with our regular field survey. Few freshwater bodies have been identified as the source of collection initiated from December 2013 onwards. Overall 12 copepods were isolated and identified upto species level. The calanoids and cyclopoids were contributed 4 and 8 species each. The calanoid *Diaptomus sicilis* was first time reported from Madipakkam lake, dominated over other copepods of the lake. Our results revealed that the copepod occurrence, particularly calanoids were very much related to the size of the water body depending on pH and DO concentrations prevail in the aquatic medium.

KEY WORDS: Copepods, Fresh water bodies

Date of Submission: 22 April 2014



Date of Publication: 05 May 2014

I. INTRODUCTION

The study of plankton from freshwater bodies of India was initiated [1] and followed by a long series on hydrobiological studies mostly from the central and northern states of India, aimed to provide a baseline information on plankton to be used in the field of aquaculture practices[2].

Copepods are extremely abundant in freshwater bodies as a vital major component together with other planktonic and benthic organisms. Their occurrence and distributions influence the status of water quality [3,4,5]. Copepods consume large quantities of bacteria, phytoplankton and fish fingerlings [6]. They are highly sensitive to anthropogenic disturbances. They also provide vital information on paleoclimatic, paleolimnological status of water bodies [7,8].

Few reports were available on copepod diversity of Velachery lake, Selaiyur and Kumaran nagar lake[9,10]. Additional informations are required to know the present status of freshwater bodies of Periurban areas which satisfy day to day needs of the residents housed in and around the lakes.

Materials and methods

Chennai is located at 13.04°N 80.17°E on the southeast coast of India. It covers an area of 172 km² with a population of about 6 million, with an estimated annual rainfall of 1285 mm, out of which 60% will receive through North East Monsoon.

Sampling Locations

Based on the preliminary survey carried out in the nearby environs, four lakes were selected for the collection of copepods namely Velachery, Madipakkam, Selaiyur and Kumaran Nagar lake.

Sampling site: 1

Lake velachery is one of the prime lake situated in the urban area of the Metropolitan city of Chennai is located 12°59'15" Latitude 80°35'40".

Sampling Site: 2

The Madipakkam lake is situated in the suburban of the metropolitan city of Chennai, Tamil nadu, Latitude 12 57 40.09 Longitude 80 12 0.45 which holds water for almost all through the year and is also losing its charm. The water is getting contaminated and its pollution levels may affect ground water.

Sampling site:3

Selaiyur lake is located in sub-urban of Chennai locality, Kanchipuram District, Tamilnadu. The Latitude of Selaiyur lake is 12.9139 N. The longitude of selaiyur lake is 80.13239 E.

Sampling site:4

Kumaran Nagar lake is located in the sub-urban of Chennai locality, Tamilnadu.

Sample Collection

The samples were collected during the early hours of the day using plankton net(60µm) by towing horizontally at a depth of 40 cm for about 10 min, immediately transported to the laboratory within an hour in an insulated polyethylene containers, fixed with 4% formaldehyde solution, identification of copepods were done using standard manuals [11,12,13].

Temperature, pH recorded insitu and other parameters were analysed by following the standard protocols [14].

Results and discussion

A total number of 12 species were identified (Table 1). Cyclopoid copepods, the most diversified group represented by 8 species and Calanoid 4 species. The copepod population contributed 67% of cyclopoid and Calanoids 33%. It was noticed that the copepod percentage contributed a major part of zooplankton populations. In Kumaran nagar lake *Mesocyclops thermocyclops* 2 species and *Mesocyclops aspericornis* 3 species were recorded.

Madipakkam lake *Halicyclops rediae* 5 species, *Diatomus theeli* 19 species, *Diatomus sicilis* 30 species and *Diatomus oregonensis* 5 species were noted, and these species were totally not recorded in other places. *Halicyclops rediae*, *Eucyclops* 5 species, *Mesocyclops aspericornis* 20 species, *Mesocyclops hyalinus* 5 species, *Mesocyclops thermocyclopoid* 10 species and *Microcyclops varicans* 3 species were distributed in Velachery Lake. In Selaiyur lake *Cyclops insignis* 3 species, *Eucyclops sp* 5 species, *Ectocyclops* 2 species, *Mesocyclops aspericornis* 10 species were noted. *Mesocyclops aspericornis* suggested as pollution indicator species by several workers were reported from the four lakes [15,16].

Temperature is one of the essential and changeable environmental factor which influence the growth and distribution of flora and fauna. The surface water temperature ranged between 22^o C and 30^o C. From the literature [17], it was reported that this temperature range is suitable for the development of planktonic organisms. Though pH is not only the factor influencing the occurrence as well as abundance of copepods, the maximum copepod densities were recorded at pH 8.3. The DO is an important aquatic environmental factor, which influences the health of an aquatic ecosystem. The Dissolved Oxygen value ranged between 0.002-0.017 mg/l. The Carbonate and Bicarbonate influence the growth of flora and fauna. In velachery lake the carbonate and bicarbonate values were ranged between 0 - 6 mg/l and 0-0.122mg/l. Madipakkam lake between 0-6mg/l and 0.061-0.219, Selaiyur between 0-12mg/l and 0 to 0.061mg/l, Kumaran nagar lake ranged between 0 -6mg/l and 0-0.122 mg/l.

It was observed that the group which is dominating in one lake, was not the one dominating in other lake. This changing behavioural patterns of the copepods can be attributed to the habitat preferences, environmental conditions or the dormancy period [18].

Table 1: List of Copepods

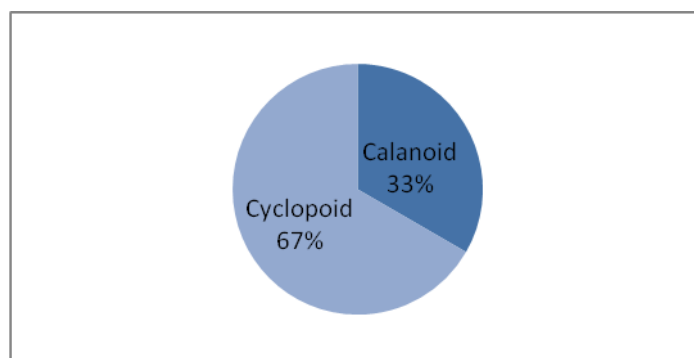
Copepod	Madipakkam lake	Velachery lake	Selaiyur lake	Kumaran nagar lake
Calanoid				
<i>Diatomus oregonensis</i>	+	-	-	-
<i>Diatomus theeli</i>	++	-	-	-
<i>Leptodiatomus sicilis</i>	++	-	-	+
<i>Leptodiatomus sp</i>	+	-	-	-
Cyclopoids				
<i>Cyclops insignis</i>	-	-	+	-
<i>Eucyclops sp</i>	-	-	+	-
<i>Ectocyclops sp</i>	-	+	+	+
<i>Halicyclops rediae</i>	+	+	-	-
<i>Mesocyclops aspericornis</i>	-	++	++	+
<i>Mesocyclops hyalinus</i>	-	++	-	-
<i>Mesocyclops thermocyclopoides</i>	-	++	-	+
<i>Microcyclops varicans</i>	-	+	+	-

+ Present, - absent, ++ abundant

Table:2 Mean value of Physico-chemical parameters in freshwater bodies of chennai

Physico-chemical parameters	Velachery lake	Madipakkam lake	Selaiyur lake	Kumaran Nagar lake
Water Temperature	22-27	24-29	24-27	26-30
pH	7.6-8	7.5-8.2	7.5-8.5	7.5-8
Dissolved Oxygen	0.002-0.004mg/l	0.004-0.031mg/l	0.002-0.004mg/l	0.004-0.017mg/l
Carbonate	0-6mg/l	0-6mg/l	0-12mg/l	0-6mg/l
Bicarbonate	0-0.122mg/l	0.061-0.219mg/l	0-0.061mg/l	0-0.122mg/l

Fig.1 Percentage composition of copepods



CONCLUSION

The result of the present study highlighted that the Copepods are abundant and showed high biomass in the four water bodies of Periurban areas. The quality of water in the four water bodies estimated were not uniform also the quality and quantum of pollution load through domestic and agricultural means. It gives a alarming signal to conserve these water bodies. Our copepod survey also provided an add on data source on copepod diversity which serve as a prime food source for fish fingerlings at their early stage consume mosquito larvae.

ACKNOWLEDGEMENT:

We thank DST (N SERB AS) New Delhi for funding support (SR/SO/AS-28/2012 dt 11.1.13)

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