

STUDIES ON DIVERSITY AND DYNAMICS OF CLADOCERA IN A SUB TROPICAL SUNGAL POND, AKHNOOR (J AND K)

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ABSTRACT

Sungal pond on Akhnoor–Sohal road was selected for the present study which involved the physico-chemical examination of the pond along with analysis of diversity and dynamics of Cladoceran from November 2009 to October 2010. A total 8 (eight) species of cladocera belonging to 6 (six) genera and 4 (four) families were recorded which enjoyed well marked seasonal dynamics in the population during the present investigation.

INTRODUCTION

Cladocera, commonly known as water fleas, are planktonic crustaceans ranging in size from 0.2 to 5.00 mm and belong to the order cladocera of Sub class Branchiopoda of class Crustacea. These micro crustaceans occupy the second trophic level i.e. primary consumer level in an aquatic ecosystem. Besides this they also serve as important diet for fishes and hence have a vital role in the stability and integrity aquatic ecosystems. (Dodson and Hanazato, 1995). Globally about 4000 species of cladocera have been described. (Covich and Tharp, 1991). About 187 species of freshwater cladocera have been reported from India (Raghunathan and Kumar, 2003). Studies on these branchiopod crustacean in India have been contributed by Biswas (1964), Nayar (1971), Battish and Kumar (1982), Michael and Sharma (1988), Raghunathan (1989), Venkataraman and Krishnamoorthy (1998). In this context, studies from aquatic habitats of Kashmir have been made by workers like Balkhi and Yousuf (1992), Yousuf and Qadri (1983), Siraj *et al.* (2006, 2007) and Pandit *et al.* (2007). Studies on crustaceans from Jammu region of the state of Jammu and Kashmir have been contributed by Gupta (2002), Sharma *et al.* (2005) and Sharma and Chanderkiran (2011). The present study was undertaken to analyze the diversity and dynamics of freshwater cladoceran from a pond in Jammu region of the state of Jammu and Kashmir.

MATERIALS AND METHODS

With an aim to investigate the diversity and dynamics of the Cladocerans, a sub tropical pond at Sungal on Akhnoor - Sohal road in Akhnoor (located between Latitude 32.87°N and Longitude 74.73°E at an altitude of 301 m (988ft) from

mean sea level in the foothills of Himalayas on the bank of River Chenab) was selected. Regular monthly visits were made to the pond for physico-chemical analysis of pond water and collection of zooplankton samples from November, 2009 to October, 2010. Physico-chemical parameters viz temperature, pH, FCO_2 , CO_3^- , HCO_3^- , DO, Mg^{++} , Ca^{++} and Cl^- were examined on the spot (APHA, 1985). For plankton, approximately 50 litres of water was filtered through plankton net of standard bolting cloth no. 25 (0.03 – 0.04 μ mesh size). The filtrate was taken in plastic vials and preserved in 5% formaldehyde solution. These fixed samples were brought to the laboratory for taxonomical studies (Ward and Whipple, 1959; Edmondson and Winberg, 1971; Pennak, 1978).

RESULTS AND DISCUSSION

The present investigation revealed the presence of 8 Species of Cladocera belonging to 7 Genera and 4 Families. The Cladocera families having their representatives include Daphniidae, Moinidae, Chydoridae and Macrothricidae. The cladoceran species recorded during present study include *Daphnia pulex*, *Daphnia similis*, *Moina brachiata*, *Macrothrix laticornis*, *Chydorus sphaericus*, *Alona rectangula*, *Ceriodaphnia reticulata* and *Simocephalus vetulus*.

Daphniidae is the dominant family with 4 species followed by Chydoridae with 2 species while Moinidae and Macrothricidae have 1 species each, thus contributing 50%, 25%, 12.5% and 12.5% respectively to the Cladoceran fauna of the water body under investigation (Fig. 1).

Well marked seasonal variations were recorded in the Cladoceran population during the present study (Table 1). The population of cladoceran passed through two minimas

Table 1: Seasonal dynamics in the population of cladoceran in Sungal pond from Nov 2009 –Oct 2010

Name of the cladoceran	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Total
<i>Daphnia pulex</i>	-	9	14	-	2	5	-	-	-	-	2	-	32
<i>Daphnia similis</i>	4	7	1	-	-	2	-	-	-	-	-	1	15
<i>Chydorus sphaericus</i>	1	-	-	2	4	-	-	-	6	19	33	23	88
<i>Ceriodaphnia reticulata</i>	3	5	-	97	390	241	18	1	-	14	55	1	825
<i>Alona rectangula</i>	-	-	-	12	184	57	4	-	-	-	2	-	259
<i>Moina brachiata</i>	-	-	-	41	412	229	-	-	-	68	185	12	947
<i>Macrothrix laticornis</i>	-	-	-	2	14	9	-	2	-	5	3	-	35
<i>Simocephalus vetulus</i>	-	-	-	3	8	1	-	-	-	-	-	1	13
Total	8	21	15	157	1014	544	22	3	6	106	280	38	2214

Table 2: Physico-chemical parameters of Sungal pond from Nov 2009–Oct 2010

Parameter	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Mean
Atm. Temp.(°C)	15	13	8	16	27	33	37	39	32	31	28	23	25.16
Water Temp.(°C)	17	11	9	17	26	29.5	31.5	33	29	25	24	23	23.35
pH	7.9	7.4	7.6	7.3	7.8	7.7	8.0	7.2	7.1	8.3	8.1	8.0	7.7
FCO ₂ mg/L	6.5	5.4	6.2	5.5	6.2	5.9	5.5	6.9	6.4	-	5.8	5.4	5.5
DO mg/L	2.8	3.3	4.2	4.1	2.7	3.5	4.3	3.1	1.8	4.5	4.1	3.1	3.45
CO ₃ ⁻	-	-	-	-	-	-	-	-	-	3.5	-	-	0.29
HCO ₃ ⁻	338	398	412	424	393	387	370	337	505	513	409	347	402.75
Mg ⁺⁺	32	39	37	35	27	22	25	23	21	31.2	29.05	34	29.60
Ca ⁺⁺	42	31	27	26	22	29	38	39	35	43	40.7	44	34.72
Cl ⁻	85	89	83	97	112	109	120	128	103	74	71	91	96.84

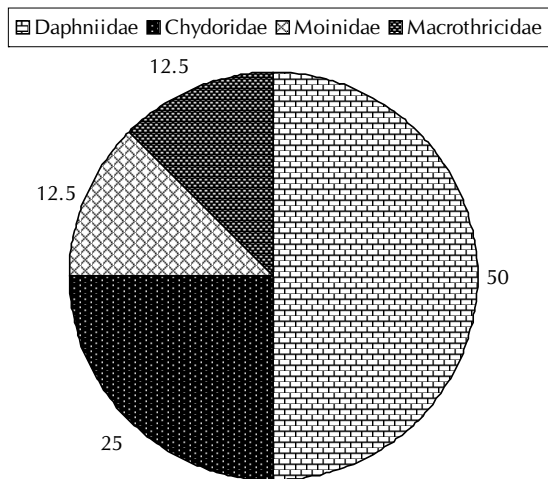


Figure 1: Percentage contribution of different families to the Cladoceran fauna of Sungal pond

and two maximas during the present study period from November 2009 to October 2010. The Cladoceran population recorded a distinct spring maxima both qualitatively and quantitatively from Feb, 2010 to April, 2010. The spring maximum is attributed to accumulation of organic matter in the pond due to rise of primary productivity on account of temperature rise in the post winter period. Another peak, in population was recorded during the monsoon (July-September), a mild monsoon maxima which can be attributed to the influx of nutrients and organic matter from surrounding catchments area which enhances the productivity of the aquatic ecosystem. These findings are in concordance with Sehgal (1980), Dalpatia (1998), Sharma (2001) and Sharma *et al.* (2005); Sharma and Chanderkiran (2011).

The population of cladocera also passed through two minimas, a summer minima (May 2010 – July 2010) and a winter minima

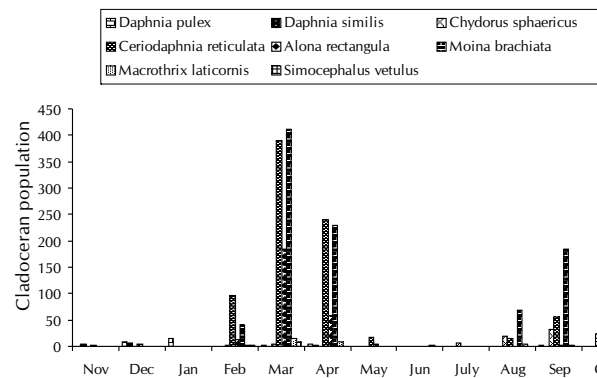


Figure 2: Seasonal dynamics of cladoceran population in Sungal pond (Nov 2009 – Oct 2010)

(November, 2009-January, 2010) which can be attributed to unfavourable temperature and other physico-chemical parameters during this period (Table 2) and limited availability of food. However *Ceriodaphnia reticulata* was nearly having a perennial existence throughout the study period and dominated Cladoceran population quantitatively during the study period and may be attributed to the wider tolerance of this species to the various physico-chemical parameters. (Siraj *et al.*, 2007; Chanderkiran, 2008).

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