INT. J. BIOL. BIOTECH., 16 (2): 505-508, 2019.

SEASONAL OCCURRENCE OF PLANKTONIC OSTRACODS AT HALEJI LAKE, SINDH, PAKISTAN

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ABSTRACT

Qualitative and quantitative zooplankton sampling was carried out during January 2006 to December 2008 in Haleji Lake. A total of 9 genera of ostracoda were identified. These include *Eucypris* sp., *Cyprinotus* sp., *Cyclocypris* sp., *Candona* sp., *Darwinula* sp., *Cypricercus* sp., *Cypridopsis* sp., *Cypria* sp., and *Heterocypris* sp. Among them the most abundant was *Cyprinotus* sp., while of *Cypridopsis* sp,. was the least recorded in all the three years.

Key words: Diversity, plankton, ostracoda, Haleji lake.

INTRODUCTION

Haleji Lake is situated at a distance of 55 miles from Karachi in the Thatta district and is located between latitude 28.48° North and longitude 67.47° East. The water supply is perennial through a canal from Keenjhar Lake known as "Haleji Minor". It has about 6.5 Sq.km surface area. Zooplanktons of fresh water has been studied by many scientists and notable contribution has been made by a number of researchers. Mahoon (1972), Mahoon and Sultana (1977), Mahoon and Niazi (1985), and Mahoon and Iqbal (1986) enlisted ostracods and other zooplanktons from Punjab. Ranta (1979) observed the population of *Darwinula stevensoni* in an oligotrophic Lake. Victor and Fernando (1982) studied the distribution of fresh water ostracods in Southeast Asia that showed affinities with those of other zoogeographical regions. Saleem *et al;* (1988) recorded the fresh water ostracods,*Candona stagnalis, Cypretta targida, Cypris passaica, Heterocypris incongruens, Cyprinotus salinus, Cypris pubera, Eucypris variens, Stenocypris malcolmsonii, Potamocypris variegata* and *Darwinula stevensoni* from N.W.F.P, Pakistan.

Malmqvist *et al*. (1997) studied the freshwater ostracoda with their distribution patterns in the Canary Islands. Kedar *et al*. (2008) also identified few species of ostracoda in Rishi Lake. Korai *et al*. (2008) reported four species of ostracoda with dominance of C*ypris* sp. in Keenjhar Lake.

MATERIAL AND METHODS

For the sampling of zooplanktons , horizontal hauls were made for about 20 minutes from a boat at a slow speed 0.1 meter/sec. by using silk bolting cloth plankton net No.20 (335 µ mesh size), with 0.25 meter in diameter at regular monthly intervals from January 2006 to December 2008. About 100 liters of water was filtered by passing water through plankton net. The plankton samples were preserved immediately in 4% formalin. The plankton catch was transferred into the counting tray and under a light compound microscope zooplanktons were identified up to genus level with the help of key by Ward and Whipple (1959), and Saleem (1988) and after counting (Individuals/Liter), mean and SD were calculated.

RESULTS

Maximum population was observed in May in all the three years whereas minimum was in February (2006 and 2008) and August (2007). The most abundant genus was *Cyprinotus* sp. during 2006-2008 while least populations of *Cypridopsis* sp. (2006 and 2007) and *Cypria* sp. (2008) were observed (Table 1, 2 and 3).

In Table 1 the maximum population was showed in May, while minimum population was observed in February. The population of ostracoda was increasing gradually from September to November. *Eucypris* sp. was observed throughout the year except February, but the population was fluctuating. Maximum population was seen in May while minima was observed in various months. Population showed a gradual increasing trend from March to May. *Cyprinotus* sp. ranged between 1 Ind./L (February) to 118 Ind./L (May). It was absent in August only. Population was increasing from March to May and September to November.

Table 1. Occurrence of Ostracoda (individual/L) in Haleji Lake during January to December 2006.

Ostracoda (Ind./L)	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**	**Dec.**	**Mean ± SD**
Eucypris sp.	2	0	3	4	24	2	2	2	2	9	14	6	5.83±6.91
Cyprinotus sp.	6	1	15	29	118	5	9	0	20	33	84	10	27.5±36.56
Cyclocypris sp.	0	0	4	8	12	0	4	0	1	4	3	1	3.08±3.72
Candona sp.	1	0	0	0	10	1	0	0	0	1	0	0	1.08±2.84
Darwinula sp.	1	0	0	0	3	2	0	0	1	1	0	0	0.66±0.98
Cypricercus sp.	1	0	0	0	8	0	1	0	0	1	0	1	1.00±2.25
Cypridopsis sp.	0	0	0	0	2	0	0	0	0	0	1	0	0.25±0.62
Cypria sp.	0	0	1	0	4	1	0	0	1	2	0	0	0.75±1.21
Heterocypris sp.	1	0	0	2	7	1	2	0	1	0	3	1	1.50±1.97
Total	**12**	**1**	**23**	**43**	**188**	**12**	**18**	**2**	**26**	**51**	**105**	**19**	

Table 2. Occurrence of Ostracoda (individual/L) of Haleji Lake during January to December 2007.

Ostracoda (Ind./L)	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Mean ± SD**
Eucypris sp.	2	1	2	5	20	1	3	1	1	7	11	7	5.08±5.68
Cyprinotus sp.	5	1	12	27	120	4	7	1	17	29	88	11	26.83±37.80
Cyclocypris sp.	1	1	3	7	11	1	5	0	2	6	4	2	3.58±3.20
Candona sp.	0	0	1	1	6	1	0	0	0	2	0	1	1.00±1.70
Darwinula sp.	1	0	0	1	4	1	0	0	2	2	0	0	0.91±1.24
Cypricercus sp.	0	0	1	0	3	0	2	0	0	1	1	2	0.83±1.02
Cypridopsis sp.	1	0	0	0	4	0	0	0	0	0	2	0	0.58±1.24
Cypria sp.	0	0	1	0	4	2	0	0	2	1	0	0	0.83±1.26
Heterocypris sp.	1	1	0	1	7	1	1	0	1	0	4	1	1.50±2.02
Total	**11**	**4**	**20**	**42**	**179**	**11**	**18**	**2**	**25**	**48**	**110**	**24**	

Cyclocypris sp. was maximum in May and minimum in September and December. It disappeared completely during January, February, June and August. *Candona* sp. was observed only in January, May, June and October. *Darwinula* sp. was observed only in January, May, June, September and October. *Cypricercus* sp. was scanty and found only in January, May, July, October and December. *Cypridopsis* sp. was rarely recorded from Haleji Lake. Its population was only in two months i.e. May and November (Table 1).

Cypria sp. showed limited population and observed during March, May, June, September and October. *Heterocypris* sp. was maximum in May. *Heterocypris* sp. was completely disappeared during February, March, August and October (Table 1).

Table 3. Occurrence of Ostracoda (individual/L) of Haleji Lake during January to December 2008.

Ostracoda (Ind./L)	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Mean ± SD**
Eucypris sp.	1	0	3	5	24	1	2	2	1	11	14	6	5.83±7.17
Cyprinotus sp.	6	1	14	29	120	5	8	0	24	30	85	10	27.66±37.14
Cyclocypris sp.	0	0	3	8	11	2	3	0	2	4	2	1	3.00±3.35
Candona sp.	1	0	0	0	9	1	0	1	0	1	0	0	1.08±2.53
Darwinula sp.	1	0	0	2	5	1	2	0	1	0	2	1	1.25±1.42
Cypricercus sp.	1	0	0	0	3	2	0	0	1	1	0	0	0.66±0.98
Cypridopsis sp.	1	0	0	0	8	0	1	0	0	1	0	1	1.00±2.25
Cypria sp.	0	0	0	0	2	0	0	0	0	0	1	0	0.25±0.62
Heterocypris sp.	0	0	1	0	4	1	0	0	1	2	0	0	0.75±1.21
Total	**11**	**1**	**21**	**44**	**186**	**13**	**16**	**3**	**30**	**50**	**104**	**19**	

In 2007 maximum population of ostracoda was noted in May (179 Ind./L) and minimum was recorded in August (2 Ind./L). Only two genera *Eucypris* sp. and *Cyprinotus* sp. were found continuously. *Eucypris* sp. was noted maximum in May (20 Ind./L) while minima was noticed in various months. From March to May and September to November the population showed gradual increase.

Cyprinotus sp. was the most abundant and commonly found throughout the year. Maximum numbers were observed in May (120 Ind./L) while minimum population was noted in February and August. *Cyprinotus* sp. showed gradual increasing population from February to May and August to November. *Cyclocypris* sp. was noted highest in May during 2007. A gradual increase in population from February to May was noted. It was absent in Augus (Table 2).

Candona sp. showed great variation in population during 2007. The highest population in May. It was absent in January, February, July, August, September and November. *Darwinula* sp. showed maximum population in May. It was completely disappeared during February, March, July, August, November and December. *Cypricercus* sp. was appeared only in March, May, July, October, November and December. Maxima was noted in May 2007.

Cypridopsis sp. was observed only in few months with scanty population. The population was noted during January, May and November. *Cypria* sp. was absent in most of the months and collected only during March, May, June, September and October with minimal numbers. *Heterocypris* sp. was highest in May. It was completely disappeared in March, August and October (Table 2).

In 2008 maximum population was observed in May (186 Ind./L), while minimum (1 Ind./L) in February. Most abundant genus was *Cyprinotus* sp. while least abundant was *Cypria* sp. *Eucypris* sp. was absent only in February. Maxima was in May (24 Ind./L) while minima was noted in different months of the year. A gradual increase in population was evident from March to May and September to November. *Cyprinotus* sp. was absent in August. Maxima (120 Ind./L) was recorded in May and minima (1 Ind./L) was in February. Gradual increase in population was recorded from February to May and September to November (Table 3).

Cyclocypris sp. was absent in January, February and August. Maximum population was recorded in May (11 Ind./L) while minimum (1 Ind./L) was observed in December. A gradual increase in population was observed from March to May. *Candona* sp. was present only in January, May (maxima-9 Ind./L), June, August and October. *Darwinula sp*. was absent in February, March, August and October. *Cypricercus* sp. was present in January, May, June, September and October. *Cypridopsis* sp. was only present in January, May, July, October and December. *Cypria sp*. was only present in May and November. *Heterocypris* sp. was absent in January, February, April, July, August, November and December. Maxima was occurred in May (Table 3).

DISCUSSION

The most perennial genus of this group was *Cyprinotus* at all study sites. *Candona, Cyclocypris, Cypris* and *Cyprinotus* were also observed in Ramgarh Lake where they showed their maxima in summer while minima in monsoon season (Kedar, *et al*., 2008). In present study the maximum numbers of ostracoda were reported during summer season (May) due to nutrient rich water (Paulose and Maheshwari, 2008). In summer maximum numbers of ostracoda produced (Ranta, 1979).

The rare genera of this group were *Cypridopsis sp*., *Cyclocypris sp*., *Cypricercus* sp., *Darwinula* sp., *Candona* sp., *Cypria* sp. and *Heterocypris* sp. The absence or less numbers of ostracoda shows that they might be in egg stage (Ferguson, 1944). According to Malmqvist, *et al*. (1997) ostracods are extensively parthenogenetic that causes sudden appearance and disappearance of their population in a water body. Air currents and other physical factors might cause wide discrepancies in local distribution of ostracods or there is a possibility of individuals' migration and collection in more favorable habitats (Ferguson, 1944).

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(*Accepted for publication March 2019*)