



Distribution of *Brachionus* species (Phylum Rotifera) in Cochin backwaters, Kerala, India

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Abstract

Distribution of thirteen species of *Brachionus* in nine stations from Cochin backwaters was studied during August 2000-July 2002. Of the 13 species, *B. plicatilis* and *B. rotundiformis* were observed in all the stations. *B. rotundiformis* was dominant with 85.76%. Detailed observations on the qualitative and quantitative distribution are presented.

Keywords: *Brachionus*, rotifer, distribution, Cochin backwaters

Introduction

Rotifers, especially *Brachionus* species, are considered to be an excellent food for larval stages of many finfishes and crustaceans. Realising the importance of *Brachionus*, Pejler (1977) gave an account on the global distribution of the family Brachionidae. Koste (1979) reviewed the Australian species of *Brachionus*. The distribution of *Brachionus* species in Spanish Mediterranean wetlands was studied by Miracle *et al.* (1987). Vasisht and Battish (1971) studied *Brachionus* species of north India. Sharma (1980a) gave an account on the family Brachionidae of Punjab. The distribution of *Brachionus* populations in ponds was dealt by Sampathkumar (1989). Su *et al.* (1998) discussed the distribution of the family Brachionidae in Mangolian waters. Much of the information available from India is concentrated on north India. In southern part of India, except those of Gopakumar (1998) and Anitha (2003), major studies were carried out in freshwater bodies.

The distribution of *Brachionus* species in many of the brackishwater habitats in Kerala is not well documented. From Cochin backwaters, Molly *et al.* (2006) gave a systematic account on *Brachionus* species and a preliminary study on the rotifer fauna was made by Molly and Krishnan (2008). Other than

these two, there is no information available so far on *Brachionus* species from Cochin backwaters.

The present study is aimed to investigate the spatial and seasonal distribution of different species of *Brachionus* both qualitatively and quantitatively in nine selected centres of Cochin backwaters.

Material and Methods

The Cochin backwaters and certain canals adjoining the system extending to about 50 km were selected for the study. Map showing the location of sampling stations is the same as given by Molly *et al.* (2006). Monthly collections of rotifers were made from nine stations *viz.* Vypeen, Puthuvypu, Narakkal, Cherai, Eloor, Fisheries Harbour, Ernakulam Market canal, Mangalavanam and Poothotta during the period from August 2000 to July 2002.

The rotifer samples were collected from each station by filtering 500 litres of water through plankton net made of bolting silk having a mesh size of 40 μ and preserved in 4% formaldehyde. From this, *Brachionus* species were identified with the help of a number of publications especially that of Nayar (1968), Koste (1978), Sharma (1983), Battish (1992) and Gopakumar (1998). They were enumerated and expressed as numbers per m³ of water. For seasonal analysis, February-May was considered as

premonsoon, June-September as monsoon and October-January as postmonsoon season. ANOVA tests were carried out to study the variations of different species of *Brachionus* between stations.

Results

Qualitative distribution: Thirteen species of *Brachionus* under the family Brachionidae were recorded. The species were *Brachionus plicatilis*, *B. rotundiformis*, *B. angularis*, *B. urceolaris*, *B. rubens*, *B. forficula*, *B. caudatus*, *B. calyciflorus*, *B. bidentata*, *B. quadridentatus*, *B. patulus*, *B. falcatus* and *B. mirabilis*. The distribution of these species in different stations is given in Table 1.

Of the 13 species, *B. plicatilis* and *B. rotundiformis*, were observed in all the stations. The maximum of 9 species was recorded in Station 5.

Quantitative distribution: The quantitative distribution of *Brachionus* spp. in different stations is depicted in Fig. 1.

The maximum abundance of *Brachionus* was noticed at station 2 (1.18 million per m³) followed by station 3 (0.82 million per m³), which may be due to the favourable conditions prevailing in those stations. The lowest number of 1053 per m³ was recorded at station 6, which is a fishing harbour site. The percentage composition of each species under the genus *Brachionus* in different stations is depicted in Fig. 2.

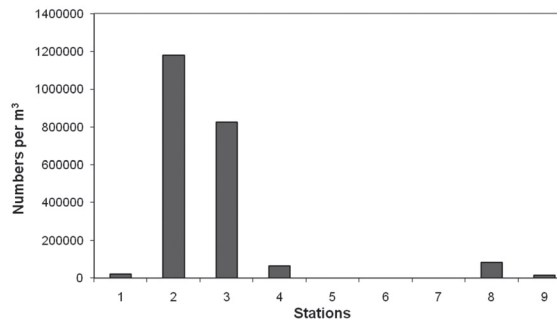


Fig. 1. Quantitative distribution of *Brachionus* spp. in different stations

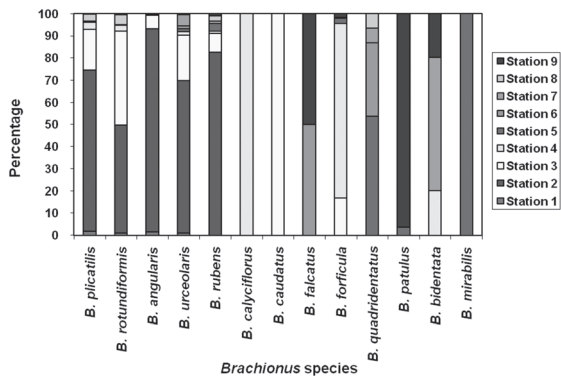


Fig. 2. Percentage composition of *Brachionus* species in the study area

Table 1. Distribution of *Brachionus* species in different stations

SI. No.	Species	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7	Station 8	Station 9
1	<i>B. plicatilis</i>	+	+	+	+	+	+	+	+	+
2	<i>B. rotundiformis</i>	+	+	+	+	+	+	+	+	+
3	<i>B. angularis</i>	+	+	+	+	+	+	+	+	
4	<i>B. urceolaris</i>	+	+	+	+	+	+	+		+
5	<i>B. rubens</i>	+	+	+	+	+	+	+	+	+
6	<i>B. forficula</i>	+	+	+	+	+		+		+
7	<i>B. caudatus</i>			+						
8	<i>B. calyciflorus</i>				+					
9	<i>B. bidentata</i>				+			+		+
10	<i>B. quadridentatus</i>					+	+	+	+	
11	<i>B. patulus</i>					+				+
12	<i>B. falcatus</i>						+			+
13	<i>B. mirabilis</i>					+				
	Total no. of species	6	6	7	8	9	6	8	5	8

+ indicates presence of species

Among the nine stations, *Brachionus plicatilis*, *B. rotundiformis*, *B. angularis*, *B. urceolaris* and *B. rubens* were abundant in station 2. Other species showed abundance beyond station 2. *Brachionus caudatus* was observed only at station 3, *B. calyciflorus* occurred only at station 4 and *B. mirabilis* only at station 5.

B. rotundiformis dominated and contributed 85.76% to the total abundance with a range of 45–96% in different stations. Next in abundance was *B. angularis* contributing 9.6%. The seasonwise

distribution of different species of *Brachionus* is given in Fig. 3.

B. rotundiformis dominated in all the three seasons, contributing 99%, 56% and 93% during premonsoon, monsoon and postmonsoon respectively. During monsoon season, *B. angularis* contributed 32%, while it formed only 3% during postmonsoon and less than 1% during premonsoon season, which perhaps indicates its less tolerance to higher salinity.

The results of ANOVA in relation to *Brachionus* species showed that, out of the 13 species recorded, the numerical abundance of 8 species viz. *B. plicatilis*, *B. rotundiformis*, *B. angularis*, *B. urceolaris*, *B. rubens*, *B. forficula*, *B. quadridentatus* and *B. patulus* showed highly significant variations between stations ($p < 0.01$).

Discussion

The results indicated the availability of 13 species of rotifers under the genus *Brachionus* in the nine stations in Cochin backwaters (central Kerala). From the southern part of Kerala, 14 species were reported by Anitha (2003). Sharma (1983) reported 20 species of *Brachionus* from Indian waters. The number of *Brachionus* spp. recorded all over the world is 55 (Segers, 2002).

According to Pennak (1957) and Jyoti and Sehgal (1979), more than two species of a rotifer genus do not occur together in a water body. Later, George (1961) recorded occurrence of three species of *Brachionus* from the ponds in Delhi. In the present study, the presence of 5 species of *Brachionus* were recorded simultaneously in stations 1, 2, 3 and 5. The number of species ranged between 5 and 9 in different stations.

Nine species of *Brachionus* viz. *B. angularis*, *B. bidentata*, *B. calyciflorus*, *B. caudatus*, *B. forficula*, *B. falcatus*, *B. patulus*, *B. quadridentatus* and *B. rubens*, recorded in the Cochin backwaters are also available in freshwater tanks and ponds in and around Sambalpur, Orissa in eastern part of India (Sharma, 1980b). This indicates high salinity tolerance of these species as well as their wide distribution.

Sharma (1991) noticed that majority of *Brachionus* spp. inhabit freshwater bodies, but *B.*

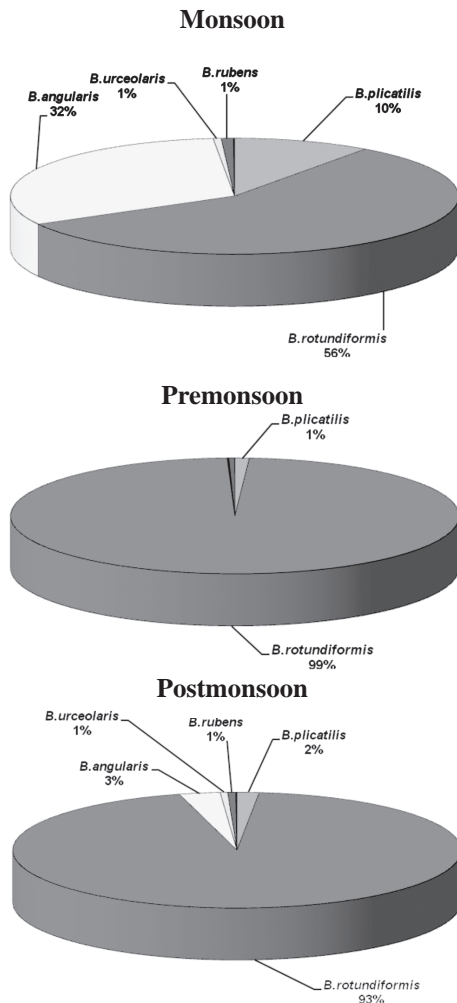


Fig. 3. Seasonwise distribution of *Brachionus* species in the study area

plicatilis is euryhaline. In the present study, except *B. rotundiformis* and *B. plicatilis*, the other 11 species of *Brachionus* were not recorded from all the stations, which indicate their restricted distribution, probably in relation to salinity. These species probably prefer lower salinities. It is worthwhile to mention here that *B. rotundiformis* was considered as S-strain of *B. plicatilis* earlier and only recently it is given a different species status (Segers, 1995). Of the nine stations studied, the lowest salinity was noticed at station 5, where salinity did not exceed 4 ppt and the maximum number of *Brachionus* species (9) was recorded from this station, which indicates the preference of *Brachionus* species to low salinities. The number of species increased from station 1 to station 5. The first station is located at the mouth of the estuary and other stations are situated subsequently upstream. Eventhough the number of species increases with low salinities, the abundance was maximum at station 2 followed by station 3, which indicates the influence of other physico-chemical parameters on the abundance of *Brachionus*.

Thus, different species were found to prefer specific environments and this information may be applied to select the strain/species of rotifer for maintaining cultures. Since rotifers are considered to be an excellent and indispensable live feed in aquaculture, long term investigations will be useful.

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