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Seasonal Distribution of Rotifera Compositions and Abundance in Kayalıköy Reservoir (Kırklareli/Turkey)

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Research Article

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Abstract

This study was carried out to determine the diversity, abundance seasonal distribution of Rotifera in Kayalıköy reservoir. Rotifera and water samples were collected monthly intervals from May 2018 to April 2019 in three different stations in the reservoir and some environmental parameters were also measured. A total of 40 species from Rotifera were determined in the reservoir. The quantitative evaluation of the Rotifera samples were found an average of 27938 ± 18992 ind/m^3in the Kayalıköy reservoir. The maximum numbers of Rotifera in the reservoir were found in autumn (42966 ind/m^3) and at 2nd station (33487 ind/m^3), the minimum numbers were recorded in winter (1474 ind/m^3) and at 1st stations (24850 ind/m^3). The most common species in the reservoir were found *Brachionus quadridentatus, Keratella cochlearis, K. quadrata, Synchaeta pectinata, Asplanchna priodonta, Polyarthra vulgaris* and *Filinia longiseta.* According to the water quality standards of Turkey, the water quality of Kayalıköy reservoir was found Class I and A1. When we examined the species identified in the reservoir, the distribution of the individuals that make up the Rotifera fauna and physicochemical parameters as a whole, it has been concluded that Kayalıköy reservoir has water suitable for drinking, agricultural irrigation and aquaculture and it's classified as oligomesotrophic character.

Keywords: Rotifera, species diversity, seasonal distribution, water quality, reservoir

Kayalıköy Baraj Gölü'nün (Kırklareli/Turkey) Rotifera Kompozisyonu, Bolluğu ve Mevsimsel Dağılımı

Özet

Bu araştırma, Kayalıköy baraj gölünün Rotifera tür çeşitliliğini, bolluğunu ve mevsimsel dağılımını belirlemek amacıyla yapılmıştır. Araştırmada Kayalıköy Barajı'nda belirlenen 3 istasyonda Mayıs 2018 ile Nisan 2019 tarihleri arasında Rotifera örnekleri toplanırken bu organizmaları etkileyen bazı çevresel parametreler de ölçülmüştür. Toplanan örneklerin değerlendirmesi sonucunda 40 Rotifera türü tespit edilirken Kayalıköy Barajı'nda yıllık ortalama 27938 ± 18992 birey/m^3 tespit edilmiştir. En fazla birey sonbahar mevsiminde (42966 birey/m^3) ve 2. istasyonda (33487 birey/m^3); en az birey Kış mevsiminde (1474 birey/m^3) ve 1. istasyonda bulunmuştur (24850 birey/m^3). Baraj gölünde *Brachionus quadridentatus, Keratella cochlearis, K. quadrata, Synchaeta pectinata, Asplanchna priodonta, Polyarthra vulgaris* ve *Filinia longiseta* türleri en yaygın türler olarak tespit edilmiştir. Türkiye su kalite standartlarına göre Kayalıköy Barajı'nın su kalitesi genel olarak I. sınıf ve A1 kalitesinde olduğu belirlenmiştir. Baraj gölünde tespit edilen Rotifera türlerinin yapısı, dağılımı ve gölde ölçülen çevresel parametreler birlikte değerlendirilmiştir. Gölün oligomesotrofik karakterde ve içme, tarımsal sulama ve su ürünleri yetiştiriciliği için uygun suya sahip olduğu sonucuna varılmıştır.

Anahtar Kelimeler: Rotifera, tür çeşitliliği, mevsimsel dağılım, su kalitesi, baraj gölü

INTRODUCTION

Reservoirs are considered favorable environments to the development of zooplankton communities, which may establish diverted assemblages in relatively short periods after impoundment (Rocha et al., 1999). Zooplankton assemblage of an in a reservoir is commonly constituted by Protozoa, Rotifera, Copepoda and Cladocera (Rocha et al., 1999). Diversity and abundance of this assemblage were changing depending on from reservoir to reservoir, environmental factors, physical, chemical, and biological factors and aquatic macrophytes structure. The species composition, distribution, diversity, and relative abundance of zooplankton of a reservoir could have a significant impact on fisheries and public health of the reservoir and its users.

Reservoir differs from natural lakes due to high external nutrient input, large drainage basin, water level changes, and human activity (Thornton et al., 1990). Freshwater pollution is a matter of serious global concern today and unfortunately our water resources continue to be more polluted day by day (Strobl and Robillard, 2008).

Rotifers are one of the most important components in zooplankton community in a freshwater ecosystem. They play a crucial role in the interlinking food chain in the aquatic ecosystem. Rotifers can also be used as "biological indicators" for water pollution studies, because their occurrence, vitality, and responses, change under adverse environmental conditions (Oliver, 1996)

Research on Rotifera has attracted the attention of several researchers throughout the world as they occupy a central position in the food web of aquatic ecosystem. Several studies have been carried out on Rotifera in freshwater ecosystem in various parts of Turkey. (Ustaoğlu et al., 2012; Ustaoğlu, 2015; Güher, 2014). There are some studies in various reservoirs in Turkey related in particular Rotifera. (Kaya and Altındağ, 2007; Bozkurt and Sagat, 2008; Buyurgan et al., 2010; Ayvaz et al., 2011; Yıldız, 2012; Saler and Alış, 2014; Tuna and Ustaoğlu, 2016; Saler et al., 2017; Güher and Çolak 2015; Dorak et al., 2019; Dorak, 2019; Güher, 2019). However, the distribution and diversity of Rotifera of Kayalıköy reservoir has not been studied so far. Therefore, in the present study, we have investigated the diversity, distribution, seasonal abundance of Rotifera and some environmental parameters to determine the best way to use and sustainable development of water resources of Kayalıköy reservoir.

MATERIALS and METHODS

The study area

Kayalıköy Reservoir was built between the years 1981 and 1986 for irrigation and flood control on Teke Stream and was named from Kayalı village to the west of the reservoir. The reservoir is located 12 km to the west of Kırklareli city center ($41^0$13'34"N; $26^0$54'14"E). Because it is surrounded by rock formations, both the lake and the littoral region lack water plants. The volume of the reservoir is 144.2 hm^3 and the surface area is 10.20 km^2. Although the reservoir is fed mainly by the Teke Stream, it is also replenished by other small streams in the region and rainfall. In addition to its role in irrigation and flood control, it is also providing drinking and domestic water of Edirne city.

Sampling

The samples were collected in monthly intervals from May 2018 to April 2019 in three different stations in the reservoir. The 1st sampling station is in the western part of the reservoir where Teke Stream feeds the lake (41°49'30.5"N; 27°06'30.3"E). The 2nd sampling station is located in the middle of the reservoir (41°47'28.3"N; 27°08'07.3"E) and the 3rd sampling station is the eastern branch of the reservoir (41°48'06.0"N; 27°09'13.1"E) (Figure 1).

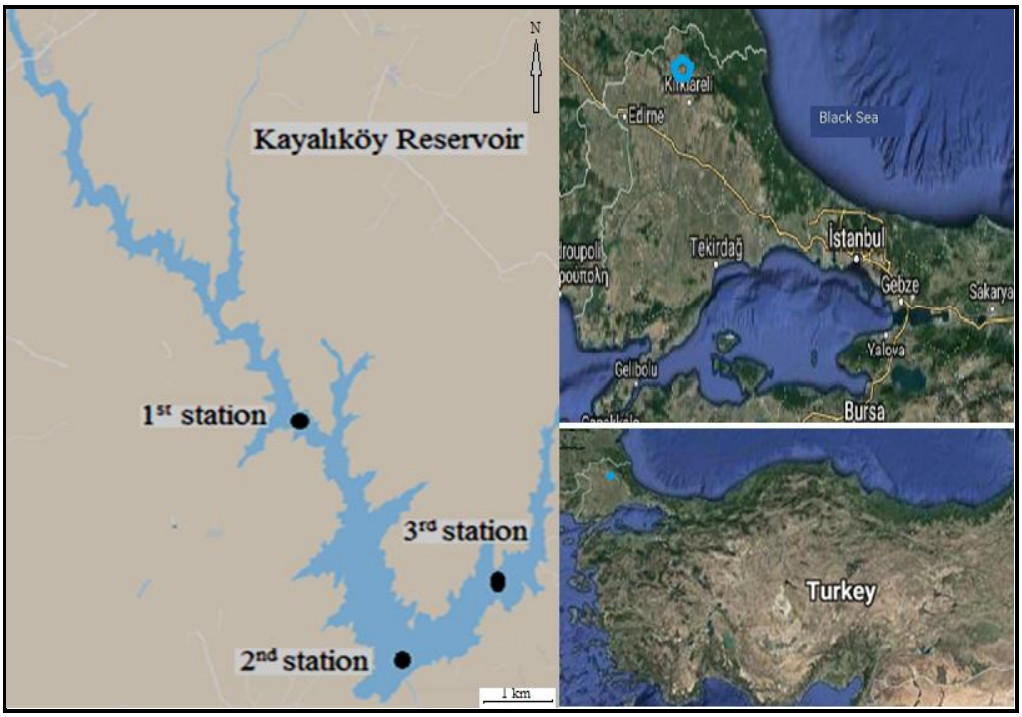

Figure 1. Location of Kayalıköy reservoir and the sampling stations

Rotifera samples were collected with a Hensen type plankton net (mesh size 55 µ, mouth diameter 15 cm, length 75 cm) vertically up to the surface from the bottom point (10 m deeply). Samples were brought to the laboratory in 250 ml plastic bottles containing 4% formaldehyde. In the laboratory, samples were identified to species level according to Ruttner-Kolisko (1974), Koste (1978), Herzig (1987), De Manuel Barrabin (2000), Segers (2008) and Ustaoğlu et al., (2012) and their counting was made according to Edmondson (1959) using an Olympus inverted microscope. Densities are presented as the number of individuals per cubic meter (ind/m^3).

Some physicochemical parameters, such as water temperature, Secchi Disk depth, conductivity, pH, dissolved oxygen were measured on-site simultaneously with the sampling time. To determine the other physicochemical and biological variables of the water, sampling was made by a Ruttner water sampler. The analyses were done in laboratories of Trakya University Technology Research Development Application and Research Center (TUTAGEM).

Shannon-Weaver index and Simpson's diversity index were used to determine the species diversity and the species richness of Rotifera in the reservoir (Shannon & Weaver, 1949). Bray-Curtis similarity index was used to examine the similarities of sampling months and stations according to diversity and abundance of Rotifera species (Jaccard 1912). Pearson Correlation was used to determine the relationship of Rotifera with environmental parameters (Krebs, 1999).

RESULTS and DISCUSSION

Physical and Chemical Variables

Sixteen environmental parameters were measured to determine the physicochemical characteristics of the Kayalıköy reservoir. The measured of environmental parameters and their minimum, maximum and average values are given in the Table 1. AT: 3.333-30.000 (°C); WT: 4.167-26.500 (°C); SD: 36.667-186.667 (cm); DO: 8.487-13.760 (mg/L); pH: 6.360 9.477; EC:177.233-319.767 (µS/cm); NO_2^{-N}: 0.002-0.131 (mg/L); NO_3^{-N}: 0.062-4.967 (mg/L); PO_4: 0.000-0.839 (mg/L); Cl_2: 8.859-25.767 (mg/L); SO_4^{2-}:14.665-17.076 (mg/L); Na:1.894-12.695 (mg/L); Mg:1.349-8.899 (mg/L); K: 0.718-25.019 (mg/L); Ca: 2.646-23.479 (mg/L); Chl-*a*: 4.333-23.833(µg/L) (Table 1). Variations in these environmental parameters according to the sampling months are given in Figure 2. In this study, no significant difference was observed in the change of physicochemical parameters according to stations. The results obtained in stations are similar to each other ($P>0.01$)

Table 1. The measured of physicochemical parameters and their minimum, maximum and average values.

	Abbreviation	According to months		According to seasons		Average of reservoir
		Min	Max	Min	Max	
Air temperature	AT (°C)	3.333	30.000	5.111	27.333	17.136 ± 9.06
Water temperature	WT (°C)	4.167	26.500	5.722	25.056	15.530 ± 7.74
Secchi disk depth	SD (cm)	36.667	186.667	50.000	130.000	94.242 ± 39.34
Dissolved oxygen	DO (mg/L)	8.487	13.760	8.653	13.760	10.277 ± 1.66
pH	pH	6.360	9.477	8.173	9.108	8.435 ± 0.79
Electrical conductivity	EC (µS/cm)	177.233	319.767	201.967	278.167	249.936 ± 41.91
Nitrite nitrogen	NO_2-N (mg/L)	0.002	0.131	0.008	0.120	0.054 ± 0.05
Nitrate nitrogen	NO_3-N (mg/L)	0.062	4.967	0.726	3.937	2.458 ± 1.67
Phosphate	PO_4 (mg/L)	0.000	0.839	0.004	0.422	0.126 ± 0.24
Chlorine	Cl_2 (mg/L)	8.859	25.767	9.635	21.583	15.675 ± 6.38
Sulphate	SO_4^{2-}(mg/L)	14.665	17.076	14.830	16.594	15.999 ± 0.78
Sodium	Na (mg/L)	1.894	12.695	2.215	11.010	7.304 ± 4.08
Magnesium	Mg (mg/L)	1.349	8.899	2.969	7.930	5.613 ± 2.71
Potassium	K (mg/L)	0.718	25.019	1.622	18.135	8.691 ± 8.58
Calcium	Ca (mg/L)	2.646	23.479	6.736	17.633	12.060 ± 6.34
Chlorophyll-a	Chl-*a* (µg/L)	4.333	23.833	4.833	16.257	10.713 ± 7.00

Maximum water temperature was recorded in July and in summer season and the minimum in January and in winter season (Table 1, Figure 2). The amount of zooplankton in fresh water is affected by temperature changes. Because temperature is the most important factor affecting the amount of nutrients and life in fresh water (Geller and Müller, 1981). In the present study, the lowest total Rotifera abundance was found in winter (1474 ind/m^3) when the water temperature reached its lowest values.

During the study period in Kayalıköy reservoir, the maximum pH was recorded in April and in spring season and the minimum in July and in summer season (average 8.435± 0.79) (Table 1, Figure 2). Many species of fish and aquatic organisms develop well in waters with a pH range of 6.5 - 8.5 (Arrignon, 1976; Dauba, 1981). The pH value of lake was moderately alkaline varying from 7.5 to 8.2 (Berzins and Pejler, 1987). According to the average pH values, Kayalıköy reservoir was rated as an alkaline water bearing reservoir.

In freshwater ecosystems, the least dissolved oxygen amount for aquatic life should not be less than 5.0 mg/L. With the oxygen content falling below 5 mg/L, living will be affected, and some species will be damaged. (Kaya and Altındağ, 2007). In this study, the mean dissolved oxygen value was found as 10.277 ± 1.66 mg/L (Table 1).

The lake is considered as eutrophic if the measured Secchi Disk is between 0.8 and 1.5 m, mesotrophic if it is between 1.4 and 2.4 m and oligotrophic if it is between 3.6 and 5.9 m (Ryding and Rast, 1989) In this study, the mean Secchi Disk value was found as 94.242 ± 39.34 (cm) (Table 1). According to Secchi Disk depth, Kayalıköy reservoir could be categorized as eutrophic. Maximum chlorophyll-*a* was recorded in August and in summer season and the minimum in February and the winter season (average 10.713 ± 7.00 µg/L) (Table 1). For ponds and dam lakes, the amount of chlorophyll-*a* in oligotrophic lakes is <3.5 µg/L, between 3.5-9.0 µg/L in mesotrophic lakes and between 9.1-25 µg/L in eutrophic lakes (Anonymous, 2015). According to the chlorophyll-a values Kayalıköy reservoir was classified as mesotrophic.

During the study period in Kayalıköy reservoir, the nitrite nitrogen concentration was recorded minimum in September and winter season and maximum in May and summer season (average 0.054 ± 0.05). Nitrate nitrogen concentration was recorded minimum in autumn and the winter season and maximum in May and spring season (average 2.458 ± 1.67). Maximum phosphate was recorded in May and in spring season and the minimum in July, August, and in the autumn season (average 0.126 ± 0.24 mg/L). Maximum sodium was recorded in November and in the autumn season and the minimum in December and winter season (average 7.304 ± 4.08 mg/L). The average of magnesium values was determined as 5.613 ± 2.71 mg/L in the reservoir. The potassium values were detected the maximum in November and in autumn season and the minimum in January and winter season (average 8.691 ± 8.58 mg/L) (Table 1, Figure 2). When we compare these results with Anonymous (2015, 2019), it can be seen that water quality is Class I and A1. Also, According to these data, Kayalıköy reservoir is suitable for drinking, agricultural irrigation, and aquaculture.

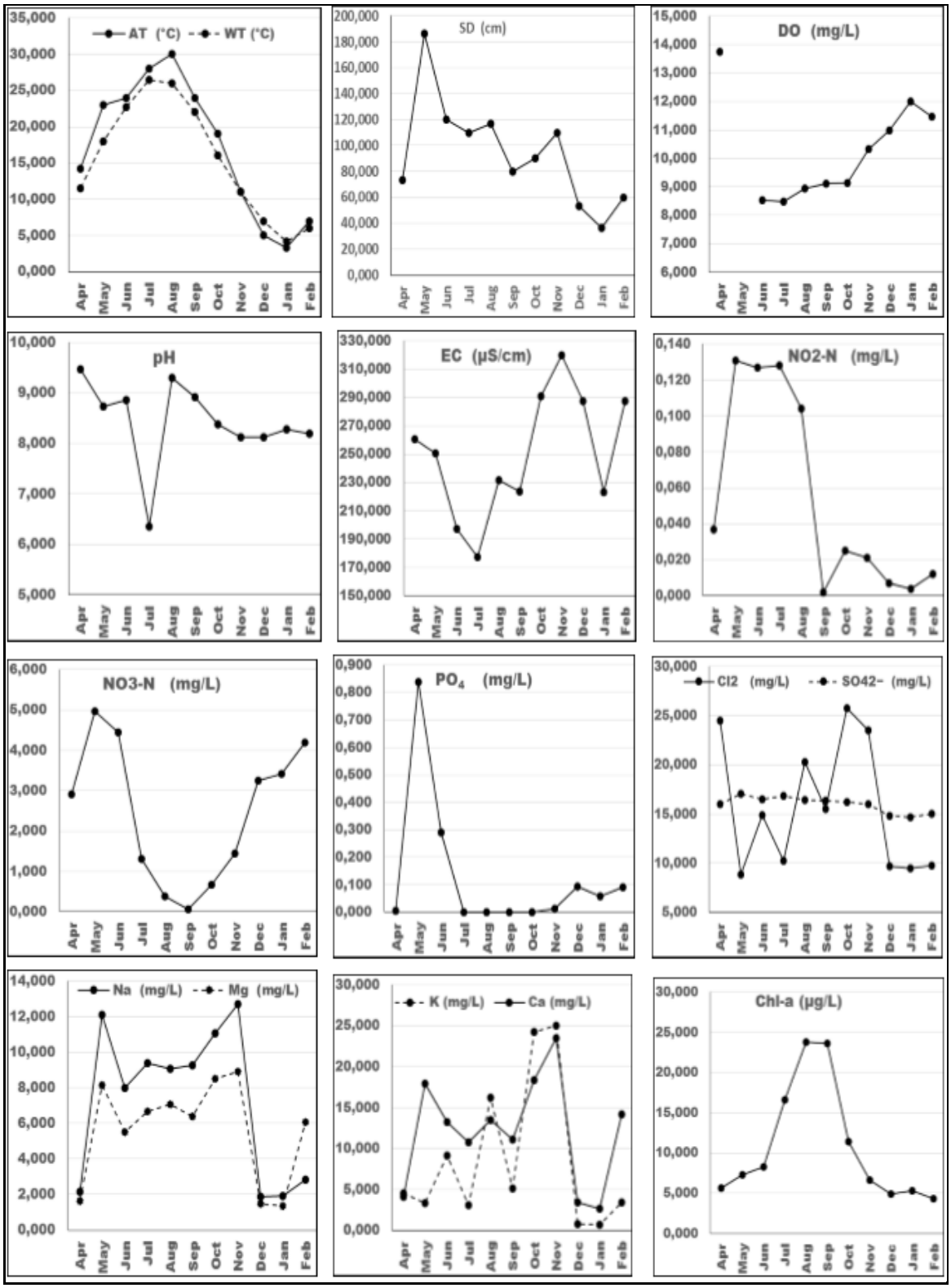

Figure 2. Variations of the physicochemical variables according to the sampling months

Rotifera community structure

As a result of the qualitative evaluation of the samples taken from the reservoir were recorded 40 species belonging to 16 families of Rotifera (Table 2). Brachionidae (15 species) and Synchaetidae (6 species) have 50% of species, especially the genera *Brachionus*, *Keratella* and *Polyarthra* (Table 2).

Table 2. Rotifera species and minimum, maximum and average values of their annual numbers per m^3

	According to months		According to seasons		Average of reservoir
ROTIFERA	**Max**	**Min**	**Max**	**Min**	
Anuraeopsis fissa Gosse, 1851	619	0	206	0	64 ± 177
Anuraeopsis navicula Rousselet, 1911	354	0	177	0	32 ± 102
Brachionus angularis Gosse, 1851	2212	0	1902	0	362 ± 740
Brachionus bidentatus Anderson, 1889	88	0	29	0	8 ± 25
Brachionus calyciflorus Pallas, 1766	2831	0	1858	0	70 ± 1054
Brachionus diversicornis (Daday, 1883)	7519	0	3479	0	1817 ± 2694
Brachionus urceolaris Müller, 1773	1504	0	752	0	137 ± 432
Brachionus quadridentatus Hermann, 1783	6812	0	4040	0	1303 ± 2083
Brachionus falcatus Zacharias, 1898	4158	0	1828	0	539 ± 1208
Brachionus plicatilis Müller, 1786	4600	0	2389	0	925 ± 1579
Kellicottia longispina (Kellicott, 1879)	34943	0	14872	0	5091 ± 10478
Keratella cochlearis (Gosse, 1851)	3273	0	2389	59	796 ± 961
Keratella quadrata (Müller, 1786)	6546	0	2975	0	1688 ± 1996
Keratella tecta (Gosse, 1851)	1415	0	472	0	129 ± 407
Keratella tropica (Apstein, 1907)	265	0	133	0	40 ± 87
Polyarthra dolichoptera Idelson, 1925	5839	0	3598	0	1078 ± 2018
Polyarthra vulgaris Carlin, 1943	4689	0	2624	0	788 ± 1492
Polyarthra remata Skorikov,1896	1238	0	752	0	169 ± 351
Polyarthra euryptera Wierzejski, 1891	796	0	265	0	80 ± 228
Synchaeta oblonga Ehrenberg, 1832	4069	0	1858	29	780 ± 1391
Synchaeta pectinata Ehrenberg, 1832	3185	0	1592	118	499 ± 886
Asplanchna priodonta Gosse, 1850	22470	0	9053	0	6072 ± 6840
Mytilina mucronata (Müller, 1773)	177	0	118	0	32 ± 68
Lecane luna (Müller, 1776)	177	0	88	0	32 ± 57
Lecane bulla (Gosse, 1886)	1858	0	1209	0	362 ± 692
Ascomorpha ovalis (Bengendahl, 1892)	3539	0	1180	59	474 ± 1010
Ascomorpha saltans Bartsch, 1870	708	0	442	0	121 ± 257
Ascomorpha ecuadis Petry, 1850	8669	0	3185	0	1021 ± 2473
Gastropus minor (Rousselet, 1892)	708	0	236	0	97 ± 218
Epiphanes macroura (Barrois & Daday, 1894)	796	0	265	0	72 ± 229
Euchlanis lyra Hudson, 1886	88	0	29	0	8 ± 25
Trichocerca capucina (Wierjeski & Zacharias, 1893)	531	0	265	0	72 ± 164
Trichocerca cylindrica (Imhof, 1891)	1327	0	531	0	249 ± 423
Trichocerca elongata (Gosse, 1886)	973	0	354	0	137 ± 293
Trichocerca bicristata (Gosse, 1887)	88	0	29	0	8 ± 25
Trichocerca longiseta (Schrank, 1802)	8493	0	3892	0	1062 ± 2520
Hexarthra mira (Hudson, 1871)	1592	0	531	0	169 ± 452
Pompholyx sulcata Hudson, 1885	442	0	265	0	48 ± 127
Testudinella patina (Hermann, 1783)	1238	0	531	0	161 ± 357
Filinia longiseta (Ehrenberg, 1834)	3008	0	1504	29	716 ± 1029
Total	53167	708	42966	1474	27938 ± 18992

When the sampling months were evaluated in terms of species diversity, the highest number of species were found in September (22 species) followed by August (21 species) and October (20 species) while the lowest species number was found in January (2 species) and February (3 species). Monthly changes in species richness, diversity, and maximum dominancy of Rotifera are given in Table 3. According to the results of Simpsons Diversity index, while species richness is the maximum (12.642) in October, it was found in its lowest value (1.245) in January. According to Shannon diversity index, while species richness is the maximum (0.969) in December, it was found in the lowest value (0.502) in January (Table 3).

Table 3. Species diversity and species richness values of Rotifera according to the sampling months

Index	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Simpsons Diversity (1/D)	6.351	2.237	2.146	5.757	3.393	9.105	12.642	3.718	4.589	1.245	1.825
Shannon J'	0.802	0.517	0.485	0.769	0.577	0.793	0.893	0.683	0.969	0.502	0.696

Anuraeopsis navicula, Brachionus bidentatus, B. urceolaris, Keratella tecta, Epiphanes macroura, Euchlanis lyra, Trichocerca bicristata were sampled only in one month during the study. The most common specie in the reservoir were *Keratella cochlearis* found in for ten months. This species is followed by *Keratella quadrata, Synchaeta pectinata, Asplanchna priodonta, Brachionus quadridentatus, Polyarthra vulgaris* and *Filinia longiseta* species that have been found for seven months. All the species determined are recorded for the first time in Kayalıköy reservoir. According to Ustaoğlu (2015) and Güher (2014), all the species recorded in the Kayalıköy reservoir are widely distributed in Turkey. Sladecek (1983) suggested the Brachionidae family and *Brachionus* species as indicators of highly trophic habitat. In this study 10 species from Brachionidae were identified. Also to determine the trophic index of the lake, *Brachionus:Trichocerca* (QB/T) equality was used (Sladecek, 1983). The QB/T index shows the rate of the number of *Brachionus* to the number of *Trichocerca*. The Q index is evaluated in three groups for the lake's trophic state, that Q=1 means oligotrophy, Q = 1.0-2.0 means mesotrophy, and Q>2 means eutrophy. In this study, Kayalıköy reservoir was determined (8 species of *Brachionus* and 5 species of *Trichocerca*) QB/T = 1.6. According to this, the Kayalıköy reservoir showed oligomesotrophic property.

The quantitative evaluation of the Rotifera samples were found an average of 27938 ± 18992 ind/m^3in the Kayalıköy reservoir (Table 2). When the sampling months were evaluated based on average individual values per m^3, the maximum number of Rotifera was found in May (53167 ind/m^3) followed by September (52731 ind/m^3), August (45117 ind/m^3) and October (44409 ind/m^3) and the minimum was found in December (708 ind/m^3) followed by January (796 ind/m^3) (Figure 3). *Asplanchna priodonta* was the leading species in terms of density (6072 ± 6840 ind/m^3), followed by *Kellicottia longispina* (5091 ± 10478 ind/m^3), *Brachionus diversicornis* (1817 ± 2694 ind/m^3) and *Keratella quadrata* (1688 ± 1996 ind/m^3). The lowest density values were measured for *Brachionus bidentatus, Euchlanis lyra* and *Trichocerca bicristata* (8 ± 25 ind/m^3), *Anuraeopsis navicula* (32 ± 102 ind/m^3), *Mytilina mucronata* (32 ± 68 ind/m^3) *Lecane luna* (32 ± 57 ind/m^3) (Table 2).

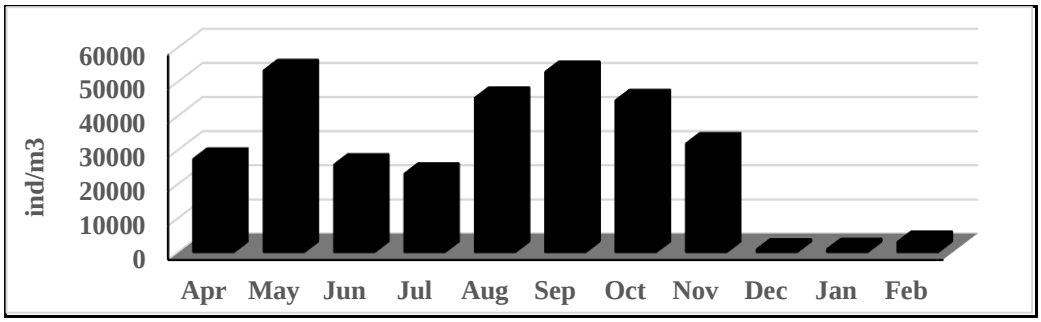

Figure 3. Total abundance of Rotifera according to the sampling months

Looking at the results of Bray-Curtis index, to compare the similarities of months according to abundance and diversity of Rotifera species identified in the reservoir, while the highest similarity was found between September-October (56.4634 %) and April- November (50.6779 %), the lowest similarity was observed between December-September (2.5257 %) and January-October (3.5217 %) (Figure 4). The highest similarity between stations was found between 2nd station - 3rd station (83.3938 %) and lowest similarity was found between 1st station –2nd station (78.006 %) and 1st station -3rd station (78.7156%) (Figure 5).

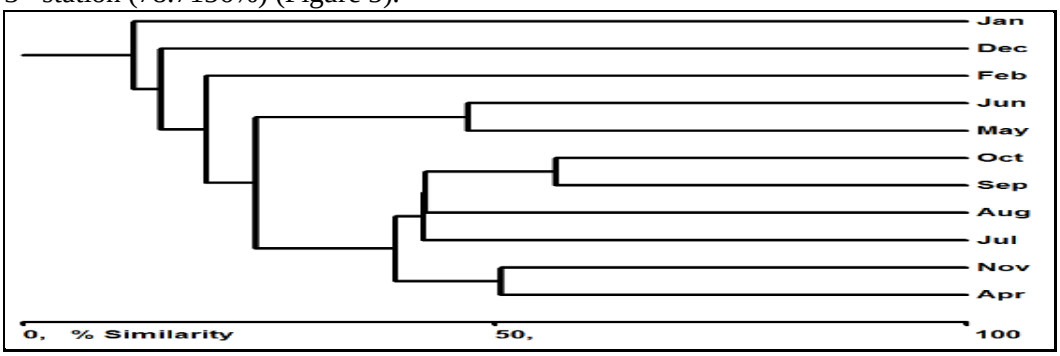

Figure 4. Bary-Curtis index similarity of Rotifera according to the sampling months

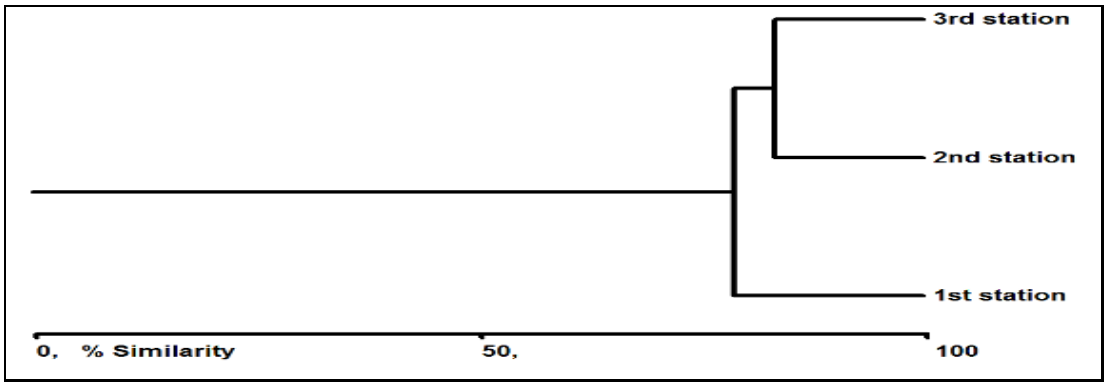

Figure 5. Bary-Curtis index similarity of Rotifera according to the sampling stations

The maximum number of Rotifera were recorded in the 2nd station (33487 ind/m^3) followed by the 3rd and 1st stations with 25478 ind/m^3 and 24850 ind/m^3, respectively (Figure 6). *Brachionus bidentatus, Euchlanis lyra* (1st) and *Trichocerca bicristata* (2nd) were found only in one station. *Keratella tropica, Lecane luna* (1st and 2nd stations) and *Pompholyx sulcata* (1st and 3rd stations) were found only in two stations and other species were found at all stations.

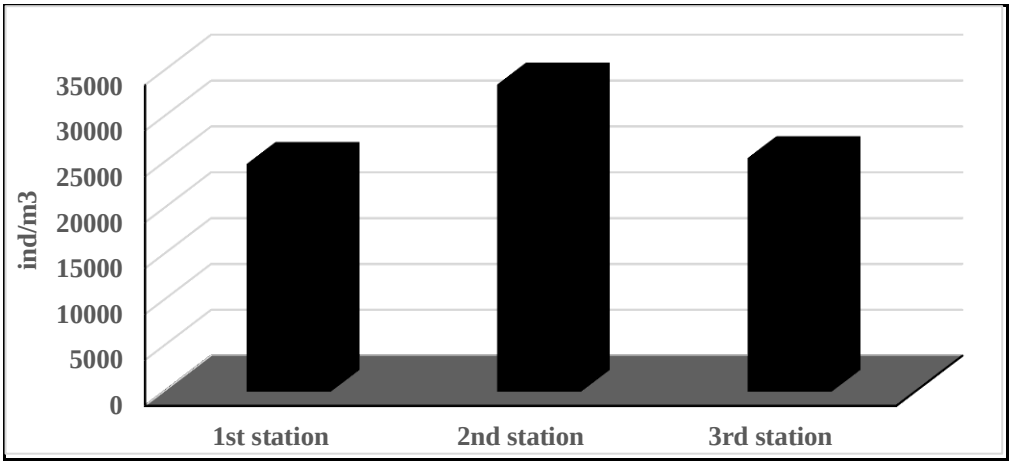

Figure 6. Total abundance of Rotifera according to the sampling stations

The maximum organism number was found in autumn (42966 ind/m^3), followed by spring (37217 ind/m^3) and summer (30096 ind/m^3) and the minimum was found in winter (1474 ind/m^3) (Figure 7). Also, the results of the cluster analysis showed that spring with summer (41 % similarity) and summer with autumn (49 % similarity) were very similar to each other apart from winter.

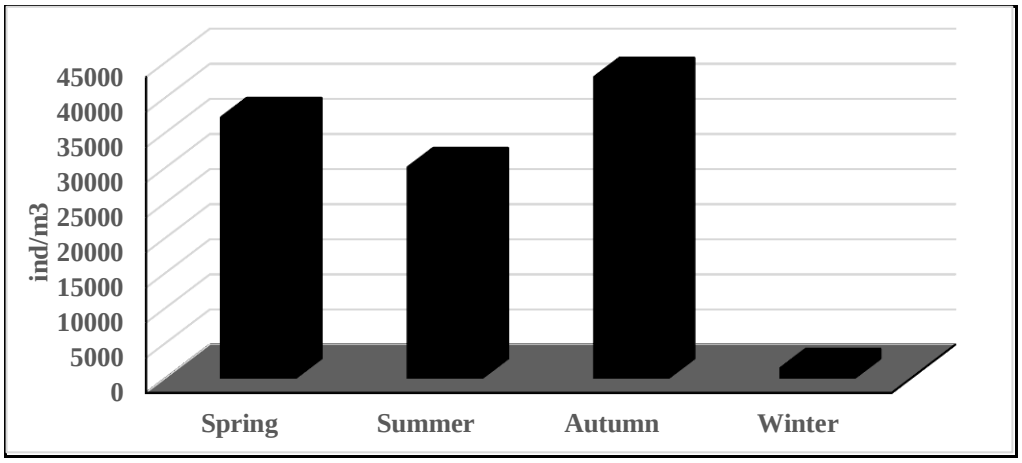

Figure 7. Seasonal total abundances of Rotifera in the reservoir

Pearson Correlation was used to determine the relationship of Rotifera with environmental parameters. Rotifera is a positive significant relationship with AT (r=0.759), WT (r=0.682), SD (r=0.701), SO_4 (r=0.827), Na (r=0.798), Mg (r=0.676) and Chl-a (r=0.616) ($P<0.01$).

When the results of this research were compared with the zooplankton data formerly reported in reservoirs, it is seen that different results were obtained in terms of Rotifera abundance and diversity depending on the characteristics of the sampled reservoirs. For instance, Buyurgan et al. (2010) reported 43 Rotifera in Asartepe Dam Lake; Ayvaz et al. (2011) reported 11 species in the Afşar reservoir; Saler et al. (2017) reported 17 species in Boztepe Tecai Kutan reservoir; Özdemir Mis and Ustaoğlu (2018) found 25 Rotifera species in the Adıgüzel reservoir; Dorak (2019) reported 33 Rotifera species in Büyükçekmece reservoir, while identified *Keratella cochlearis Polyarthra vulgaris Synchaeta oblonga Brachionus urceolaris Epiphanes macroura* as the most common species. Güher (2019) found 33 species belonging to Rotifera in Kadıköy reservoir while reported *Asplanchna priodonta, Brachionus angularis, Filinia terminalis* and *Keratella cochlearis,* as the most common species. As it is observed in these researches, diversity and abundance of Rotifera varies depending on from reservoir to reservoir, environmental factors, physical, chemical and biological factors.

CONCLUSION

In conclusion a total of 40 Rotifera species were determined in the qualitative and quantitative evaluation of plankton in Kadıköy reservoir during the study period. All the species determined are recorded for the first time in Kayalıköy reservoir. According to Ustaoğlu et al. (2012), Ustaoğlu (2015) and Güher (2014), all the species recorded in the Kadıköy reservoir are widely distributed in Turkey. The most common species in the reservoir were found *Brachionus quadridentatus, Keratella cochlearis, K. quadrata, Synchaeta pectinata, Asplanchna priodonta, Polyarthra vulgaris* and *Filinia longiseta.* Also, *Anuraeopsis navicula, Brachionus bidentatus, Brachionus urceolaris, Keratella tecta, Epiphanes macroura, Euchlanis lyra, Trichocerca bicristata* were found only in one month during. In terms of the species diversity, it was found that the richest months were September, October and August (respectively 22, 21, 20 species) followed by April with 13 species.

The quantitative evaluation of the Rotifera samples were found an average of 27938 ± 18992 ind/m^3in the Kayalıköy reservoir. In the present study, while the maximum numbers of Rotifera in the Kayalıköy reservoir were found in autumn (42966 ind/m^3) and at 2nd station (33487 ind/m^3), the minimum numbers were recorded in winter (1474 ind/m^3) and at 1st stations (24850 ind/m^3). The result of the cluster analysis showed that the stations were very similar to each other (78-83% similarity). The comparison of the results of physicochemical analyses with Anonymous (2015, 2019), it can be seen that water quality is Class I and A1. On the other hand, according to Secchi Disk and chlorophyll-a, there is a transition from mesotrophic level to eutrophic. *Brachionus*:*Trichocerca* (QB/T) index and nutrient salts was determined mesotrophic. It can be classified as oligotrophic character according to other parameters. Rotifera species with AT, WT, SD, SO_4, Na, Mg, and Chl-*a* was a positive significant relationship was found.

When we examined the species identified in the reservoir, the distribution of the individuals that make up the Rotifera fauna and physicochemical parameters as a whole, it has been concluded that Kayalıköy reservoir has water suitable for drinking, agricultural irrigation and aquaculture and it's was classified as oligomesotrophic character.

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