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Determination zooplankton fauna of Bayındır Dam Lake (Ankara)

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A B S T R A C T

Zooplankton samples were collected from four stations in Bayındır Dam Lake between April 2022 and January 2023 using a 60 μm plankton net with horizontal and vertical hauls, and some water quality parameters (water temperature, pH, dissolved oxygen, and conductivity) were determined in-situ. The annual mean water temperature, dissolved oxygen, pH and conductivity were 17.64±7.64 °C, 7.92±0.18 mgL^{-1}, 9.26±1.00 mgL^{-1}, 368.52±24.69 μS cm^{-1} respectively. Water quality parameters were within normal limits for most aquatic organisms. A total of 87 species were recorded in the reservoir, including 66 rotifers (75.86%), 15 cladocerans (17.24%) and 6 copepods (6.90%). A total of 22 families from Rotifera, 5 families from Cladocera and 2 families from Copepoda were recorded. Brachionidae and Lecanidae (Rotifera) having most of the species were the richest families with 10 species each. With 8 Chydoridae species from Cladocera and 5 Cyclopoidae species from Copepoda, they were discovered to be the most numerous family. It was determined that the dam lake zooplankton consisted of widely distributed cosmopolitan and eutrophication indicator species.

INTRODUCTION

Species composition is crucial for the conservation and control of biodiversity, which is a nation's greatest natural resource (Ceballos et al., 2010). It is clear that necessary actions regarding the sustainable management, and particularly protection of ecosystems, cannot be done because of the lack of taxonomic information. It is known that our country has a very rich fauna composition, but unfortunately, there is still not enough taxonomic information about most of the living groups (Bozkurt and Genç, 2018). Turkey has a good number and length of rivers, lakes, and dam lakes (with a surface area of about one million hectares), that is negatively impacted by the ever-increasing environmental deterioration and settlements.

From the past to the present, many reservoirs have been built in Turkey for drinking water supply, irrigation, flood control, and energy production (Yuksel, 2015). However, as a result of population growth and industrialization, reservoirs are at risk of eutrophication, and the extension of eutrophic conditions could result in biodiversity loss and disruption of the food chain's balance (Brito et al., 2011). As a result, limnological and biological factors in reservoirs should be investigated and evaluated, and the results should be used to improve their water quality. Reservoir biotic and abiotic factors can influence zooplankton species diversity, density, biomass, and spatiotemporal distribution (Dorak et al., 2019).

Most aquatic organisms consume zooplankton throughout their entire lives, while others feed on zooplanktonic organisms for a certain part of their lives, especially in the larval stage (Sales, 2011). This explains the strong correlation between the variety and abundance of zooplanktonic organisms and the productivity of the aquatic environment (Brun et al., 2019).

They play an important role in aquatic environments as most zooplankton (copepod, cladoceran, and rotifer) feed on phytoplankton and rapidly convert plants into animal protein (Svanberg et al., 2022). Although zooplankton is an essential component of the food chain, some species are thought to be good indicators of eutrophication, pollution, and water quality because of their sensitivity to environmental changes (Ismail and Adnan, 2016). For this reason, lake zooplankton studies are becoming increasingly significant. Since zooplankton abundance and composition are closely related to water quality characteristics, they increase and decrease depending on the trophic status of the lakes (İpek Alış and Saler, 2016).

Characterizing the zooplankton fauna of our country, which has very rich and diverse freshwater resources, will contribute to a full understanding of Türkiye's biodiversity.

Previous studies in the dam include: Atıcı et al. (2005) on water pollution control and phytoplanktonic algae flora and Erdoğan (2015) on the taxonomic and limnoecological investigation of Rotifera fauna. No detailed records of zooplankton studies in Bayındır Dam Lake (Ankara). Therefore, this study is aimed at determining the zooplankton fauna of the dam lake.

MATERIALS AND METHODS

The study was carried out between April 2022 and January 2023 in Bayındır Dam Lake (39 ˚ 54 44.52 N, 32 ˚ 59 45.04 E) in Mamak District of Ankara province (Figure 1). Bayındır Dam Lake was built on the Bayındır Stream between 1962 and 1965 for the purpose of supplying drinking water. Body volume of the dam, which is an earth body fill type, is 553.000 m^3 and its height from the stream bed is 30 m. The lake volume at normal water level is 6.97 hm^3, and the lake area at normal water level is 0.71 km^2. It provides 7 hm^3 of drinking and utility water per year and its height above sea level is 940 m. Although Bayındır Stream feeds the dam lake to a great extent, it is also fed by other small creeks around the lake that dry up in summer and autumn.

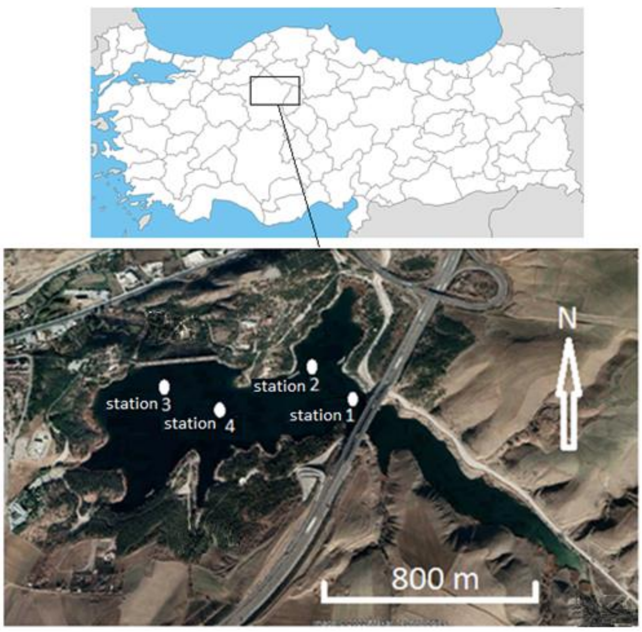

Figure 1. Bayındır Dam Lake and sampling stations

Zooplankton samples were collected seasonally from 4 different stations, three stations from the creek entrances and one station from the mixing points of the creeks, using a plankton net with a diameter of 0.30 m and a mesh size of 60 µm, with horizontal and vertical hauls. Vertical hauls were carried out from the bottom to the surface ten times while horizontal hauls were taken from the water surface for 20 minutes at about 2 mph with a motor boat. All zooplankton samples were fixed in 4% formalin. Dissolved oxygen, water temperature, and conductivity were determined insitu using digital instruments (oxygen and temperature: YSI model 52 oxygen meter; conductivity: YSI model 30 salinometer). Calculations and statistical analysis were conducting using MS Excel and PAST software (PAleontologicalSTatistics, Version 3.20) (Hammer et al., 2001).

Zooplankton species were examined and identified using an inverted microscope and a binocular microscope (Olympus CH40). The specimens were identified using Apostolov and Marinov (1988), Borutsky (1964), Damian-Georgescu (1970), Dussart (1967), Dussart (1969), Holynska et al., (2003), Karaytug (1999), Reddy (1994), Rylov (1963), Segers (1995), Scourfield and Harding (1966), Smirnov (1974) and Negrea (1983).

RESULTS

Water temperature varied between 6.64°C (winter) and 26.80°C (summer), with mean of 17.64±7.64°C (Table 1). It was determined that the pH values were close to each other between stations and seasons. The maximum, minimum, and mean pH values were 7.27 (summer), 9.10 (winter) and 7.92±0.18 respectively (Table 1). Dissolved oxygen varied between 7.00 mgL^{-1} (summer) and 10.81 mgL^{-1} (winter), with a mean of 9.26 ± 1.00 mgL^{-1} (Table 1). The conductivity value ranged from 302.4 µS cm^{-1} (summer) to 544.4 µS cm^{-1} (spring) with mean value of 368.52±24.69 µS cm^{-1} (Table 1).

Table 1. Some water quality parameters (max.-min. and seasonal mean in stations)

	Spring 2022	Summer	Fall	Winter 2023	mean
Temp (°C)	18.34-20.80 19.59±2.98	24.14-26.80 25.96±1.49	16.3-18.62 17.50±0.85	6.64-8.30 7.53±0.65	17.64±7.64
pH	7.50-8.96 8.07±0.69	7.27-8.62 7.67±0.44	7.49-8.70 7.90±0.43	7.55-9.10 8.02±0.53	7.92±0.18
DO (mgL^{-1})	9.20-10.60 9.95±0.46	7.00-8.50 7.86±0.57	8.84-9.81 9.25±0.32	9.22-10.81 9.96±0.46	9.26±1.0
EC (μScm^{-1})	302.4-544.4 392.21±75.23	329-365.4 339.51±13.71	331.2-380.2 356.83±21.82	371.6-412.8 385.54±13.87	368.52±24.69

A total of eighty-seven species were recorded out of which sixty-six (66) species were Rotifera (75.86%), 15 species were Cladocera (17.24%), and 6 species were Copepoda (6.90%) (Table 2). A total of 22 families were recorded among Rotifera with Brachionidae and Lecanidae being the richest with 10 species while Philodinidae, Conochilidae, Trichotriidae, Scaridiidae, Dicranophoridae, Habrotrochidae, and Cotylegaleatidae had 1 species each. Five families were recorded among Cladocera with Chydoridae being the richest with 8 species and least was Bosminidae, Ilyocryptidae and Macrothricidae with one species each (Table 2). Among the 2 families of Copepoda, Cyclopoidae had 5 species, and Ameiridae was represented by one species (Table 2).

The most widely distributed rotifers were recorded in all the seasons,. The rotifers recorded in three seasons were *K. longispina, K. cochlearis, A. priodonta, T. emarginula, A. ovalis, G. stylifer, F. longiseta, T. pocillum, P. dolichoptera, P. vulgaris, S. oblonga, R. rotatoria L. luna, C. adriatica, L. patella, S. stylata, D. aculeata* and *C. gibba* (Table 2).

Table 2. Seasonal indexes (Mean±SE) of sardine individuals in İzmir and Kuşadası Bays

Rotifera	Sp	Su	Fa	Wi		Sp	Su	Fa	Wi
Brachionidae					**Asplanchnidae**				
Anuraeopsis fissa Gosse, 1851	-	ııı	ııı	-	*Asplanchna priodonta* Gosse, 1850	ı	*	*	ııı
Brachionus angularis Gosse, 1851	ıı	-	-	-	*Asplanchna sieboldi* (Leydig, 1854)	ıı	-	-	ı
Brachionus quadridentatus Hermann, 1783	-	ı	-	-	**Collothecidae**				
Kellicottia longispina (Kellicott, 1879)	ııı	ı	*	ı	*Collotheca mutabilis* (Hudson, 1885)	-	*	ıı	-
Keratella cochlearis (Gosse, 1851)	ıı	ııı	ıı	ıı	*Collotheca pelagica* (Rousselet, 1893)	ı	ııı	-	-
Keratella quadrata (Müller, 1786)	ıı	*	-	-	**Testudinellidae**				
Keratella tecta (Gosse, 1851)	ı	*	-	-	*Testudinella emarginula* (Stenroos, 1898)	*	*	*	*
Notholca caudata Carlin, 1943	*	-	-	-	*Testudinella parva* (Ternetz, 1892)	-	*	-	*
Notolca squamula (Müller, 1786)	*	-	-	-	**Gastropodidae**				
Platyias quadricornis (Ehrenberg, 1832)	-	*	*	-	*Ascomorpha ovalis* (Bergendahl, 1892)	ı	*	ı	*
Lecanidae					*Gastropus stylifer* Imhof 1891	ı	ı	ı	ııı
Lecane bulla (Gosse, 1886)	-	ı	*	-	**Philodinidae**				
Lecane closterocerca (Schmarda, 1859)	-	*	*	-	*Philodina megalotrocha* Ehrenberg, 1832	-	*	-	-
Lecane flexilis (Gosse, 1886)	-	*	*	-	**Trochosphaeridae**				
Lecane ludwigi (Eckstein, 1893)	-	ı	*	-	*Filinia longiseta* (Ehrenberg, 1834)	ı	ı	ııı	*
Lecane luna (Müller, 1776)	-	*	*	-	**Conochilidae**				
Lecane lunaris (Ehrenberg, 1832)	-	*	*	*	*Conochilus unicornis* Rousselet, 1892	ıı	*	-	-
Lecane nana (Murray, 1913)	-	*	-	-	**Trichotriidae**				
Lecane pyriformis (Daday, 1905)	-	*	*	-	*Trichotria pocillum* (Müller, 1776)	*	*	*	*
Lecane quadridentata (Ehrenberg, 1830)	-	*	-	-	**Scaridiidae**				
Lecane stenroosi Meissner, 1908)	-	*	-	-	*Scaridium longicaudum* (Muller, 1786)	-	-	*	-
Lepadellidae					**Dicranophoridae**				
Colurella adriatica Ehrenberg, 1831	-	*	*	*	*Dicranophorus grandis* (Ehrenberg, 1832)	-	-	*	-
Colurella colurus (Ehrenberg, 1830)	-	*	-	-	**Habrotrochidae**				
Colurella obtusa (Gosse, 1886)	-	*	-	*	*Habrotrocha aspera* (Bryce, 1892)	*	-	-	-
Colurella uncinata (Müller, 1773)	-	ı	-	*	**Cotylegaleatidae**				
Lepadella ovalis (Müller, 1786)	-	*	*	-	*Cotylegaleata iskenderunensis* De Smet & Bozkurt, 2016	-	-	*	-
Lepadella patella (Müller, 1773)	ı	*	*	-	**Cladocera**				
Lepadella quadricarinata (Stenroos, 1898)	-	*	-	-	**Daphniidae**				
Lepadella rhomboides (Gosse, 1886)	-	*	-	-	*Ceriodaphnia pulchella* Sars, 1862	ı	*	ıı	ı
Synchaetidae					*Daphnia longispina* (Müller, 1785)	ı	*		ııı
Polyarthra dolichoptera Idelson,1925	ııı	ııı	ııı	ıı	*Scapholeberis kingi* Sars, 1888	-	*	*	-
Polyarthra vulgaris Carlin, 1943	ııı	ı	ıı	ıı	*Simocephalus vetulus* (Müller, 1776)	ı	-	*	ı
Synchaeta oblonga Ehrenberg, 1832	ııı	ıı	ııı	*	**Bosminidae**				
Synchaeta pectinata Ehrenberg, 1832	ı	-	-	-	*Bosmina longirostris* Müller, 1785	ı	-	ıı	ııı
Synchaeta stylata Wierzejski, 1893	-	*	ııı	ı	**Ilyocryptidae**				
Trichocercidae					*Ilyocryptus agilis* Kurz, 1878	-	-	ı	-
Trichocerca longiseta (Schrank, 1802)	ı	*	-	-	**Macrothricidae**				
Trichocerca pusilla (Jennings, 1903)	-	*	-	-	*Macrothrix laticornis* (Jurine, 1820)	-	ıı	ı	-
Trichocerca cylindirica (Imhof, 1891)	-	*	-	-	**Chydoridae**				
Trichocerca similis (Wierzeski, 1893)	-	ı	ıı	-	*Alona costata* Sars, 1862	-	-	*	*
Trichocerca weberi (Jennings, 1903)	-	*	-	*	*Biapertura affinis* (Leydig, 1860)	-	ı	ı	*
Notommatidae					*Coronatella rectangula* (Sars, 1862)	-	*	*	*
Cephalodella gibba (Ehrenberg, 1830)	*	*	-	*	*Chydorus sphaericus* (Müller, 1776)	ı	*	ı	*
Cephalodella ventripes (Dixon-Nuttall, 1901)	-	*	-	-	*Graptoleberis testudineria* Fischer, 1851	-	*	*	-
Cephalodella catellina (Müller, 1786)	-	*	-	-	*Pleuroxus aduncus* (Jurine, 1820)	-	*	-	-
Monommata dentata Wulfert, 1940	-	*	-	*	*Pleuroxus laevis* Sars, 1861	-	ı	-	-
Notommata copeus Ehrenberg, 1834	-	*	-	-	*Leydigia acanthocercoides* (Fischer, 1854)	-	-	ı	-
Philodinidae					**Copepoda**				
Dissotrocha aculeata (Ehrenberg, 1832)	-	*	*	*	**Cyclopidae**				
Rotaria neptunia (Ehrenberg, 1830)	ı	-	-	*	*Cyclops vicinus* Uljanin, 1875	ııı	*	-	ıı
Rotaria rotatoria (Pallas, 1766)	*	ı	ıı	ı	*Eucyclops serrulatus* (Fischer, 1851)	-	*	-	-
Mytilinidae					*Eucyclops macrurus* (Sars, 1863)	-	-	-	*
Lophocharis salpina (Ehrenberg, 1834)	-	*	*	-	*Macrocyclops albidus* (Jurine, 1820)	-	*	*	*
Mytilina mucronata (Müller, 1773)	-	*	-	-	*Paracyclops fimbriatus* (Fischer, 1853)	*	*	*	-
Euchlanidae					**Ameiridae**				
Euchlanis deflexa (Gosse, 1851)	*	*	-	-	*Nitokra hibernica* (Brady, 1880)	-	*	*	*
Euchlanis dilatata Ehrenberg, 1832	-	*	-	-	**Number of zooplankton species**	**34**	**72**	**47**	**35**

Key: (Sp: spring, Su: summer, Fa: fall, Wi: winter, - = Absent, * = very few -1/10 individuals in each petri, ı = few -10/30 individuals in each petri, ıı = abundant -30/60 individuals in each petri, ııı = very abundant -more than 60 individuals in a petri)

For the Cladocera, *C. pulchella, B. longirostris, C. sphaericus* recorded in 4 seasons, had the largest distribution range and followed by *D. longispina, S. vetulus, B. affinis* and *C. rectangula* (shown 3 seasons). On the other hand, *C. vicinus, M. albidus, P. fimbriatus* and *N. hibernica* had the largest distribution range (found in 3 seasons) among the copepods.

Some zooplankton species had limited distribution and were recorded in one season. *M. mucronata, B. angularis, B. quadridentatus, N. copeus, E. dilatata, N. caudata, N. squamula, P. megalotrocha, L. nana, L. quadridentata, L. stenroosi, S. longicaudum, D. grandis, C. iskenderunensis, C. colurus, L. quadricarinata, L. rhomboides, S. pectinata, T. pusilla, T. cylindirica, C. ventripes, C. catellina* (Rotifera), *I. agilis, P. aduncus, P. laevis, L. acanthocercoides* (Cladocera), *E. serrulatus* and *E. macrurus* (Copepoda) were recorded in one season (Table 2).

As a result of quantitative analysis, it was observed that zooplankton abundance was generally low. Out of 87 species recorded, only 23 species were very abundant (ııı) and abundant (ıı) in various seasons, while other species were fewer in number. *G. stylifer, A. priodonta, B. longirostris,* and *D. longispina* (Winter); *P. dolichoptera, F. longiseta, S. stylata, S. oblonga* and *A. fissa* (Fall); *K. cochlearis, P. dolichoptera, A. fissa,* and *C. pelagica* (Summer); *K. longispina, P. dolichoptera, P. vulgaris, S. oblonga* and *C. vicinus* (Spring) were very abundant (ııı) (Table 2).

The abundant (ıı) species were *P. dolichoptera, P. vulgaris, K. cochlearis, C. vicinus* (winter), *K. cochlearis, P. vulgaris, R. rotatoria, C. mutabilis, T. similis, B. longirostris, C. pulchella* (fall), *S. oblonga, M. laticornis* (summer), *K. cochlearis, K. quadrata, A. sieboldi, B. angularis* and *C. unicornis* (spring) (Table 2).

Most zooplankton species were recorded in summer with 72 species. This was followed by autumn with 47 species, winter with 35 species, and spring with 34 species. In terms of abundance, 5 species in spring and autumn, 4 species in summer and winter were very abundant (ııı). Zooplankton were abundant (ıı) in autumn with 7 species, in spring with 5 species, in winter with 4 species and in summer with 2 species (Table 2).

Table 3. The relationships between zooplankton and water quality parameters

	Zooplankton species number	Zooplankton abundance
Temp	R^2= 0.81	R^2= 0.95
pH	R^2= 0.98	R^2= 0.68
Con	R^2= 0.89	R^2= 0.58
DO	R^2= 0.71	R^2= 0.89

The correlation between water temperature, pH, conductivity, DO and Zooplankton species number and Zooplankton abundance is as seen in Table 3. It was determined that there was a significant relationship between temperature-zooplankton abundance (R^2= 0.95) and pH-zooplankton species number (R^2= 0.98).

DISCUSSION

Temperature affects the reproduction, nutrition and metabolic activities of aquatic organisms by increasing the biological activity in the water and accelerating the biochemical reactions and is one of the most important environmental parameters that affect and control the species diversity and zooplankton density in aquatic ecosystems (Sharma et al., 2007). Studies have shown that environmental characteristics, especially water temperature have a significant impact on zooplankton composition and abundance, and that high zooplankton abundance is associated with high water temperature (Rossetti et al., 2009; Dorak, 2013). Similar results were observed in our study, and the highest number of species (72 specimens) were found in the summer season when the average temperature was the highest (25.96±1.49). Similarly, zooplankton abundance was high in spring (19.59±2.98) and autumn (17.50±0.85) when the temperature was partially high, in accordance with the reports of Pennak (1989) and Hunt and Matveev (2005).

Conductivity is important water quality parameters that is significantly correlated with zooplankton abundance and distribution (Estlander et al., 2009). Although the change in the conductivity of a lake water depends on various factors, it varies depending on the temperature of the water, the amount of water entering the lake and precipitation. In general, while the conductivity increases with the increase of water temperature, it also increases due to evaporation when there is not enough rain or stream inflow. At the same time, pollution can also increase the conductivity of lakes and rivers, as industrial and human wastewater often have high conductivity (Wetzel, 1983). Electrical conductivity was high in spring and winter, and low in summer and autumn in the dam lake. It is not possible to comment on the seasonal variation of the conductivity due to the lack of sufficient information on precipitation amounts, the amount of water entering the lake and the pollutants. The conductivity value specified in the protocol on fisheries standards and the protection of surface water resources against pollution is between 400–1000 µS cm^{-1} (OSIB, 2015). It was determined that the conductivity values ranged between 302.4 and 544.4 µS cm^{-1}, the conductivity in all seasons was within normal limits and suitable for zooplankton life (Estlander et al., 2009).

The amount of dissolved oxygen varies according to the temperature and the trophic status of the lakes (Viet et al., 2016). The majority of zooplankton species can tolerate high amounts of oxygen, and studies have shown that low oxygen conditions can impair zooplankton growth, reproduction, and distribution. Dissolved oxygen levels below 5 mgL^{-1} in fresh water can restrict zooplankton growth (Karpowicz et al., 2020). In the study, the lowest dissolved oxygen was recorded in summer and the highest in winter, due to the fact that high temperature decreases dissolved oxygen in water, while it increases it at low temperature. The recorded dissolved oxygen levels (7.00 - 10.81 mgL^{-1}) were higher than 5 mgL^{-1}. The lake appears to be suitable for zooplankton life based on the dissolved oxygen level.

pH, which is important for the life cycle of zooplankton, can affect zooplankton abundance; Alkaline conditions associated with high primary production favor zooplankton growth and abundance (Bednarz et al., 2002; Mustapha, 2009), while low pH results in reduced zooplankton abundance, biodiversity, and extinction of some species (Ivanova and Kazantseva, 2006). It is stated in The Ministry of Forestry and Water Affairs of the Republic of Turkey (OSIB, 2015) that the pH values of fresh water to be between 6.00 and 9.00 in the regulation of Quality Criteria for Turkish Surface Water Resources. The pH values of the reservoir were between 7.27 and 9.10, its level was slightly to moderately alkaline and it was suitable for zooplankton species to live (Tessier and Horwitz, 2011).

Related studies have shown that rotifera was predominant in both qualitative and quantitative characteristics in most lenthic waters (Jamila et al., 2014; Ismail and Adnan, 2016; Dorak et al., 2019; Saler et al., 2019). Furthermore, Segers (2008) reported that rotifers are common in freshwater environments, including sewage ponds, and that they are also opportunistic in pertubed environments.

The dominant taxa recorded - *Asplanchna, Brachionus, Keratella, Notholca, Collotheca, Testudinella, Lecane, Colurella, Lepadella, Ceriodaphnia, Polyarthra, Synchaeta, Rotaria, Euchlanis, Daphnia, Scapholeberis, Simocephalus, Bosmina, Trichocerca, Alona, Coronatella, Chydorus, Pleuroxus, Cephalodella, Cyclops* and *Eucyclops* were common in inland waters of Türkiye (Ustaoğlu, 2004; Ustaoğlu et al., 2012; Ustaoğlu, 2015; Tugyan and Bozkurt, 2019). On the other hand, almost all of the zooplankton species are cosmopolitan, widespread species (Ramdani et al., 2001; Eldredge and Evenhuis, 2003) and are highly tolerant to changes in environmental conditions (Ustaoğlu, 2004; Bozkurt and Güven, 2010; Özdemir Mis et al., 2011; Bozkurt and Akın, 2012; Gaygusuz and Dorak, 2013; Saler et al., 2015; Ustaoğlu, 2015; Bozkurt et al., 2018).

Zooplankton plays a key role in indicating the degree of eutrophication and water pollution (Heneash and Alprol, 2020). Species belonging to the genus *Brachionus, Lecane,* and *Keratella*, which are important eutrophication markers (Mola, 2011) and; were widely recorded in this study. Rotifers, which are generally more abundant in eutrophic waters, respond much more quickly to environmental changes in aquatic environments and are more sensitive indicator organisms to changes in water quality (Ceirans, 2007)..

Consequently, *A. fissa, A. priodonta, B. angularis, B. quadridentatus, C. mutabilis, E. dilatata, F. longiseta, K. longispina, K. cochlearis, K. qaudrata, K. tecta, L. bulla, L. luna, L. lunaris, L. patella, N. squamula, P. quadricornis, P. dolichoptera, R. neptunia, T. cylindrica, T. pusilla, B. longirostris, C. sphaericus, C. rectangula, D. longispina, G. testudinaria, C. vicinus, E. serrulatus* recorded in this study have been reported to be eutrophic indicators (Dussart, 1969; Voigt and Koste, 1978; Pesce and Maggi, 1981; Berzins and Bertilsson, 1990; Hansen and Jeppesen, 1992; De Manuel Barrabin, 2000; Petrusek, 2002; Shah and Pandit, 2013; Apaydın Yağcı, 2016).

Some of the recorded species *A. fissa, A. priodonta, A. sieboldii, B. angularis, B. quadridentatus, C. catellina, C. gibba, C. ventripes, C. mutabilis, C. pelagica, C. adriatica, C. colurus, C. obtusa, C. uncinata, E. deflexa, E. dilatata, F. longiseta, K. longispina, K. cochlearis, K. quadrata, K. tecta, L. bulla, L. closterocerca, L. flexilis, L. luna, L. lunaris, L. nana, L. pyriformis, L. quadridentata, L. ovalis, L. patella, L. quadricarinata, M. mucronata, P. quadricornis, P. dolichoptera, S. longicaudum, S. oblonga, S. pectinata, T. emarginula, T. longiseta, T. pusilla, T. weberi* and *T. pocillum* have been reported to tolerate a wide range of conductivity (RuttnerKolisko, 1974; Herzig and Koste, 1989; Arcifa et al., 1994; De Ridder and Segers, 1997; Baribwegure and Segers, 2001; Pattnaik, 2014).

Based on some zooplankton species (especially *Brachionus, Lecane,* and *Keratella*), it can be said that the dam lake was tending towards eutrophication in line with Erdoğan (2015).

CONCLUSION

The zooplankton species were cosmopolitan and widely distributed species. Rotifera was the dominant group, followed by Cladocera and Copepoda. The dominant families were Brachionidae and Lecanidae (Rotifera), Chydoridae (Cladocera) and Cyclopoidae (Copepoda). It can be said that the lake is in tending towards eutrophication due to the dominance of Rotifera (*Brachionus, Keratella,* and *Lecane*) that were eutrophication indicators. Moreover it can be seen that most of the species recorded have ecological characteristics suitable for being in the dam where the study was conducted.

Compliance with Ethical Standards

Authors' Contributions

This study was produced from the postgraduate thesis of Deniz Ulaş Can, a graduate student. All authors have contributed equally to the work. All authors read and approved the final manuscript.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Approval

For this type of study, formal consent is not required.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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