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Zooplankton diversity of three dam lakes in Turkey

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Introduction

Zooplanktons are a basic link in transformation of energy from producers to consumers and play a key role as efficient filter feeders on phytoplankton and as food source for other invertebrates, fishes and their larvae. Zooplanktonic organisms are bioindicators of water quality and pollution because they are strongly influenced by environmental changes and respond quickly to alternations in water quality (Sharma *et al*., 2010; Deksne *et al*., 2011). Some studies have conducted on the zooplankton of different Turkish dam lakes such as Kesikköprü (Yiğit, 1998), Cip (Saler and Şen, 2000), Aslantaş (Bozkurt, 2002), Kapulukaya (Kök, 2005), Ömerli (Altunyurt, 2006), Gelingüllü (Kaya and Altındağ, 2007), Çamlıgöze (Dirican and Musul, 2008), Sarıyar (Atıcı *et al*., 2008), Tahtaköprü (Ülgü, 2008), Kemer (Tuna, 2009), Sarımsaklı (Aydın and Ahıska, 2009), Asartepe (Buyurgan *et al.*, 2010) Hasan Uğurlu, Suat Uğurlu (Bozkurt and Akın, 2012), Sürgü (İpek Alış and Saler, 2013), Kalecik (Bulut and Saler, 2013), Beyhan (Bulut and Saler, 2014), Uzunçayır (Saler *et al.*, 2014), Hancağız (Saler and Alış, 2015) dam lakes.

The present study aimed to identify the zooplankton species and determine their seasonal composition and diversity in Tercan, Kuzgun and Demirdöven Dam Lakes where no earlier relevant data is available.

Materials and methods

The study was conducted on Tercan, Kuzgun and Demirdöven Dam Lakes. Seasonal samplings of zooplankton were taken between January to December 2014 (Fig. 1).

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Figure 1: Locations of Kuzgun, Demirdöven and Tercan Dam Lakes.

Tercan Dam with an area of 9 km^2 and volume of 178 km^3 is one of the most important drinking, irrigation and energy resource of Erzincan that was built on Tuzla Stream during 1969-1988. Kuzgun Dam with an area of 11 km^2 and storage capacity of 312 hm^3 was built on Serçeme Stream between 1985-1986, for the purpose of irrigation and producing energy. Demirdöven Dam is a small dam with an area of 2 km^2 and volume of 34 hm^3 which was constructed on Tımar Stream for irrigation.

Zooplankton samples were collected with a 55µ mesh Hydro-bios plankton net and preserved in 4% formaldehyde solution. The zooplankton identification to the species level was conducted by using the following references, and densities were calculated as the number of individuals per cubic meter (ind. m^{-3}) Rylov, (1963), Dussart (1967, 1969), Kolisko, (1974), Koste (1978), Kiefer, (1978), Segers, (1995), Einsle, (1996), Smirnov, (1974, 1992, 1996). Nogrady and Segers (2002) .

The species diversity was calculated by Shannon-Weaver diversity index (Shannon and Weaver, 1949), species dominance was determined by Simpson diversity index (Simpson, 1949) and the species evenness was estimated following Pielou (1966).

Sorensen's similarity index (Magurran, 2004), measures similarity in species composition for

Results and discussion

During this study all together 38 zooplankton species were identified, including 25 species of Rotifera, 8 species of Cladocera and 5 species of Copepoda. Systematic of the identified species is given in Table 1. Rotifera comprised 65.7%, Cladocera 21.1% and Copepoda 13.2% of the total zooplankton species. Seasonal individual number (ind. m^{-3}) of zooplankton in Tercan, Kuzgun and

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Demirdöven Dam Lakes are given in Table 2.

Keratella quadrata was observed in 10 samples. *P. dolichoptera* followed this species being present in 9 samples. During the study period *A. sieboldi, B. calcyflorus, K. quadrata, K. cochlearis, K. tecta, L. closterocerca, L. luna, L. lunaris, L. ohioensis, P. dolichoptera, C. sphaericus, D. cuculata, D. longispina, D. magna, M. micraura* and *A. denticornis* were observed in all of the three dam lakes. *D. longipina* was the dominant Cladocera species which occurred in 6 samples. Among the copepod species *A. denticornis* had the highest frequency of occurrence. These species were present in 8 samples.

Temperature (°C), dissolved oxygen (mg L^{-1}) and pH values of Tercan, Kuzgun and Demirdöven Dam Lakes are given in Table 3.

Table 1: Zooplankton species in the study area.

Classis	Subclassis	Order	Suborder	Family	Species
Eurotatoria	Monogononta	Ploima		Brachionidae	
					Brachionus calyciflorus Pallas, 1766
					B. urceolaris (Müller, 1773)
					Keratella quadrata (Müller, 1786)
					K.cochlearis (Gosse, 1851)
					K.tecta (Lauterborn,1900)
					Kellicottia longispina (Kellicott, 1879)
				Euchlanidae	*Euchlanis dilatata* Ehrenberg, 1832
				Trichotriidae	*Trichotria tetractis* (Ehrenberg, 1830)
				Lepadellidae	*Colurella obtusa* (Gosse,1886)
					Lepadella ovalis (Müller,1786)
					L. patella (Müller,1786)
				Lecanidae	*Lecane luna* (Müller, 1776)
					L.ohioensis (Herrick,1885)
					L.ecane lunaris (Ehrenberg,1832)
					L.closterocerca Schmarda, 1859)
				Notommatidae	*Cephalodella catellina* (Müller, 1786)
					C.forficula (Ehrenberg, 1830)
					C.gibba (Ehrenberg, 1830)
					Notommata glyphura Wulfert, 1935
				Trichocercidae	*Trichocerca similis* (Wierzejski, 1893)
				Gastropodidae	*Ascomorpha saltans* Bartsch, 1870
				Synchaetidae	*Polyarthra dolichoptera* Idelson, 1925
					Synchaeta pectinata Ehrenberg, 1832
				Asplanchnidae	*Asplanchna sieboldi* (Leydig, 1854)
		Flosculariacea		Filiniidae	*Filinia pejleri* Hutchinson,1964
Branchiopoda	Phyllopoda	Diplostraca	Cladocera	Daphniidae	*Daphnia magna* Straus, 1820
					D.cucullata Sars, 1862:
					D. longispina Müller, 1785
				Sididae	*Diaphanosoma birgei* Korinek, 1981
					D.brachyurum, (Liévin, 1848)
				Bosminidae	*Bosmina longirostris* (Müller, 1785)
				Chydoridae	*Chydorus sphaericus* (Müller, 1776)
				Moinidae	*Moina micrura* Kurz, 1874
	Copepoda	Calanoida		Diaptomidae	*Acanthodiaptomus*
					denticornis (Wierzejski, 1887)
					A. robustus (Sars, 1863)
		Cyclopoida		Cyclopoidae	*Cyclops abyssorum* Sars, 1863
					C. vicinus Uljanin, 1875
					Megacyclops viridis (Jurine, 1820)

Table 2: Seasonal individual number (ind. m^{-3}) of zooplanktons in Tercan, Kuzgun and Demirdöven Dam Lakes.

Species	Tercan Dam Lake				Kuzgun Dam Lake				Demirdöven Dam Lake			
	Sp	Su	Au	Wi	Sp	Su	Au	Wi	Sp	Su	Au	Wi
A. saltans	2911						2911	2183				
A. sieboldi	1092					727		363			727	363
B. calcyflorus	363	1820			1820		727		1092			
B. urceolaris	727				727		727					
C. catelina									363			
C. forficula					727				363			

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Table 2 continued:												
C. gibba	363											
C. obtusa	1092											
E. dilatata		1056							363	727		
F. pejleri		3275							1092			
K. longispina					1820			1056				4730
K. quadrata	2911	4002		727	1092	4366	1092	10553	1092		1056	1092
K. cochlearis	4366	5095		363	12008	17103	4002	6914	4366			
K. tecta			1092				3275		1092			
L. closterocerca	1456	1092		727	363				727			
L. luna	1092		1056		363		1092		1056			
L. lunaris		1092	1820			1092			1092			
L. ohioensis	727		727		1092				1092			
L. ovalis			727									
L. patella	363		1092									
N. glyfura			363	727								
P. dolichoptera	6550	1820			6186	26568	2547	6186	4366		2547	792
S. pectinata							1092		1092			
T. similis	363		1092						363			
T. tetractis	1092	727							363			
B. longirostris	727				1820	2183						
C. sphaericus	1820				1820	727			727		727	
D. birgei						727				5822	363	
D. brachyurum							1820					
D. cuculata	727				1092	727			727		727	
D. longispina	727				1820	3630				1092	2183	363
D. magna	363					5095			1092	727		
M. micraura				727	1820	727				1092		
A. denticornis	1820				4002	1092	727	1092		106258	1456	4366
A. robustus									1820			
C. abyssorum									1056	14180		2183
C. vicinus	727				6186	20742		1820				
M. viridis								1820				

Table 3: Temperature (C^o), dissolved oxygen (mg L^{-1}) and pH values of Tercan Kuzgun and Demirdöven Dam Lakes.

	Tercan Dam Lake				**Kuzgun Dam Lake**				**Demirdöven Dam Lake**			
	Sp	**Su**	**Au**	**Wi**	**Sp**	**Su**	**Au**	**Wi**	**Sp**	**Su**	**Au**	**Wi**
Temperature (C^o)	17.2	21.2	18.1	6.2	14.3	20.8	16.9	5.6	16.2	22.8	14.7	5.3
DO (mg L^{-1})	7.9	5.9	6.1	8,9	8.2	6.2	6.3	9.1	8.1	6.7	6.9	9.4
pH	7.8	7.7	8.2	8.3	8.0	8.1	7.9	7.9	8.2	8.1	7.9	7.9

In all of the dam lakes the most number of taxa were recorded in spring and the least number of taxa were recorded in winter except Demirdöven Dam Lake. In this lake in winter and summer the same number of species (7 species) have been identified (Table 2). The most number of zooplankton was calculated as 129898 ind. m^{-3} in Demirdöven Dam Lake in summer, the least number of individuals was recorded in Tercan Dam Lake with 3271 ind m^{-3} (Table 4, Fig. 2). Among the three dam lakes the most and least number of taxa were recorded in Tercan Dam Lake. In this lake 22 species were identified in spring, whereas only 5 species were identified in winter.

Table 4: The seasonal densities of zooplankton (individual m^{-3}) in Tercan, Kuzgun and Demirdöven Dam Lakes.

Zooplanktonic Group	**Tercan Dam Lake**				**Kuzgun Dam Lake**				**Demirdöven Dam Lake**			
	Sp	**Su**	**Au**	**Wi**	**Sp**	**Su**	**Au**	**Wi**	**Sp**	**Su**	**Au**	**Wi**
Rotifera	25468	19979	7969	2544	26198	49856	17465	27255	19974	727	4330	6977
Cladocera	4364	19979	7969	727	8372	13816	1820	0	2546	8733	4000	363
Copepoda	2547	0	0	0	10188	21834	727	4732	2876	120438	1456	6549
Total	32379	39958	15938	3271	44758	85506	20012	31987	25396	129898	9786	13889

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In Tercan and Kuzgun Dam Lakes Rotifera were the dominant group in all seasons. In Demirdöven Dam Lake Rotifera lost its dominance in summer. In summer Copepoda were observed in high numbers.

In all of dam lakes Rotifera comprised the dominant group followed by Cladocera. The highest numbers of taxa were observed in Tercan Dam Lake (28 species). Rotifera has got its maximum taxa (21 species) in this dam lake. In Tercan Dam Lake Rotifera was comprised 75%, in Kuzgun Dam Lake 61% and in Demirdöven Dam Lake 67% of the total zooplankton (Fig. 2).

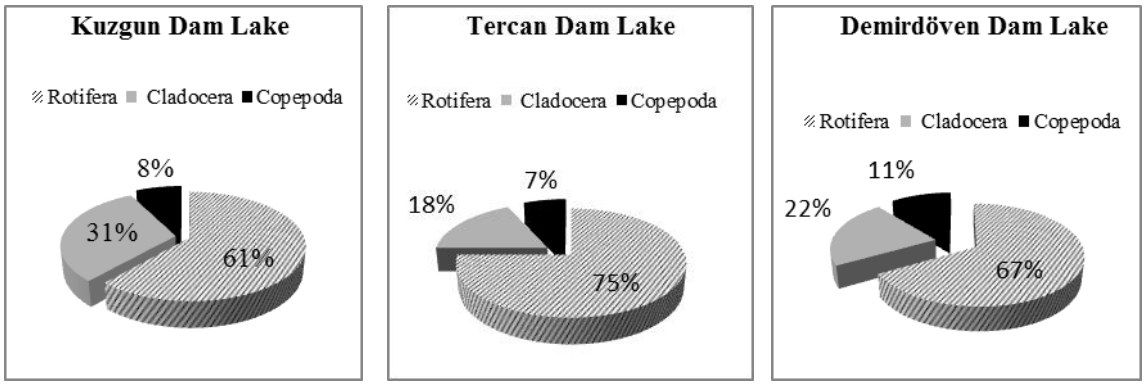


Figure 2: The relative density (%) of zooplankton taxa in the dam lakes.

In Cip (Saler and Şen, 2000), Kesikköprü (Yiğit, 1998), Göksu (Bekleyen, 2003), Kepektaş (Saler, 2009) Gelingüllü (Kaya and Altındağ, 2007) Çamlıgöze (Dirican and Musul, 2008), Asartepe (Buyurgan *et al*., 2010), Karakaya (Saler *et al*., 2010), Hasan Uğurlu and Suat Uğurlu (Bozkurt and Akın, 2012), Beyhan (Bulut and Saler 2014) dam lakes rotifers were reported as dominant zooplanktonic group both in term of number of individuals and frequency of occurrence.

In Tercan, Kuzgun and Demirdöven Dam Lakes the highest number of species were recorded in spring followed by summer. Similar data were recorded in Kepektaş (Saler, 2009), Asartepe (Buyurgan *et al.,* 2010) and Uzunçayır (Saler *et al.,* 2014) Dam Lakes.

Among the identified zooplankton, (*B. angularis*, *B. calyciflorus*, *C. gibba*, *L. lunaris*, *L. patella*, *K. cochlearis*, *K. quadrata*, *S. pectinata*, *P. dolichoptera*, *A. sieboldi*, *F. longiseta*, *E. dilatata*, *B. longirostris*, *C. sphaericus*, *P. aduncus*, *A. denticornis C. vicinus*, *M. viridis*) are cosmopolite species and occur in pelagic region and aquatic macro vegetation areas (Kolisko, 1974; Braioni and Gelmini, 1983; Koste and Shiel, 1987; Ramdani *et al.,* 2001; Bozkurt and Akın, 2012). *K. quadrata* was the dominant rotifer species of all three dam lakes which is resistant to high changes in temperature and emerge among plants in lentic habitats and slow flowing lotic habitats (Braioni and Gelmini, 1983; Bozkurt and Akın,

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2012). *C. vicinus* occurs in lakes, rivers, marshes, and the littoral regions of all varieties of aquatic habitats (Dussart, 1969). This species occurred in Tercan and Kuzgun Dam Lakes.

All of the index values have been consistent with each other. Shannon-Wiener index (*H'*) values varied between 2.75 and 0.68. The highest *H'* value was recorded in the whole dam lakes in the spring, whereas the low value of the index was calculated in winter period (Table 5).

Margalef's species richness index (M) showed noticable fluctations. The lowest value (M=0.49) was observed in winter and the highest value (M=2.02) was recorded in spring. Both of these values were recorded in Tercan Dam Lake. Both of the Simpson's highest value (D=11.63, in spring), and lowest value (1.46, in summer) of dominance index (D) were measured in Demirdöven Dam Lake. The highest value of Equitability (Evenness) Pielou's index (J=0.98) was calculated in winter in Tercan Dam Lake, but the lowest index (J=0.35) was obtained in summer in Demirdöven Dam Lake. The variations were not major throughout the study period in all dam lakes (Table 5). Sorenson similarity index values were given by a cluster diagram (Fig. 4).

According to Ramdani et *al.*, (2001), the Cluster analysis provide an important visual figure of the comparision based on the zooplankton distribution. Cluster analysis of zooplankton species determined in three of the dam lakes are given in figure 4. The hierachical cluster analysis dendrogram has shown the highest similarty (77.7%) between the species of Demirdoven and Kuzgun Dam Lakes species (Fig. 5). According to Sorenson's coefficient, these communities had much overlap or similarity.

In the present study, seasonal changes showed variations in zooplankton population, and most of the species were least documented in during winter. Our results were similar to the zooplankton analysis of Singh *et al.* (2002). In all of the dam lakes, the maximum zooplankton populations were observed in spring and summer due to favourable conditions of high level nutrients, increased photo period and high intensity of light.

Table 5: Seasonal index values of Tercan, Kuzgun and Demirdöven Dam Lakes.

Name of index	Tercan Dam Lake			
	Spring	**Summer**	**Autumn**	**Winter**
Margalef index (M)	2.02	0.80	0.77	0.49
Simpson index (D)	10.89	6.30	6.90	4.76
Shannon-Wiener index (*H'*)	2.71	1.99	2.01	1.58
Pielou index (J)	0.87	0.90	0.96	0.98
Total number of species (N)	22	9	8	5
Kuzgun Dam Lake				
Margalef index (M)	1.49	1.15	1.01	0.77
Simpson index (D)	7.66	4.88	7.98	4.84
Shannon-Wiener index (*H'*)	2.38	1.89	2.21	1.80
Pielou index (J)	0.84	0.71	0.92	0.82
Total number of species (N)	17	14	11	9

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Table 5 continued:				
Demirdöven Dam Lake				
Margalef index (M)	1.97	0.51	0.76	0.62
Simpson index	11.63	1.46	5.91	3.99
Shannon-Wiener index (*H'*)	2.75	0.68	1.91	1.57
Pielou index (J)	0.90	0.35	0.91	0.81
Total number of species (N)	21	7	8	7

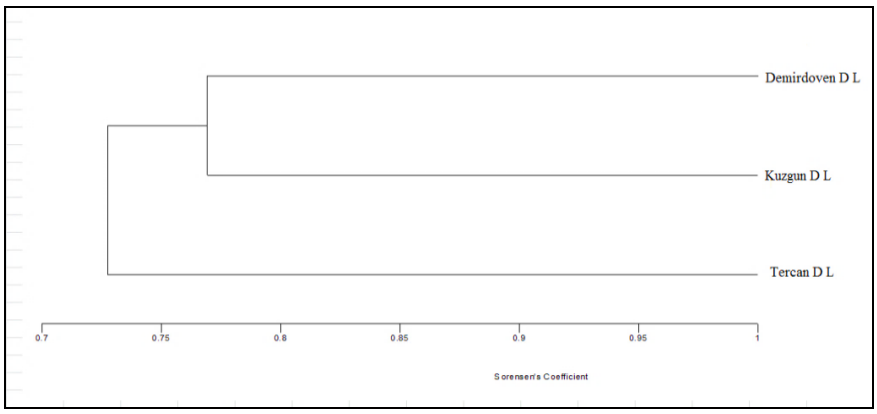


Figure 4: Sorenson similarity index values of Tercan, Kuzgun and Demirdöven Dam Lakes.

The high value of Shannon index (*H'*) demonstrated greater species diversity. This indicates a larger food chain and more favourable conditions of interspecific interactions which increases the stability of the community (Ludwick and Reynold, 1998). In present study, Demirdöven Dam Lake showed greater species diversity. Pielou index (J) that is also known as evenness index, indicates whether all species in a sample are equally abundant or not. It was also found that species evenness decreased with increasing the number of zooplankton population in the dam lakes. Thus evenness was relatively high at Tercan Dam Lake during winter and at Kuzgun and Demirdöven Dam Lakes in autumn.

References

Altunyurt, S., 2006. Determination of seasonal variation of zooplankton in Ömerli Dam Lake. MSc Thesis, Marmara University Institute of Science, Istanbul. 94 P.

Atıcı, T., Ahıska, S., Altındağ, A. and Aydın, D., 2008. Ecological effects of some heavy metals (Cd, Pb, Hg, Cr) pollution of phytoplanktonic algae and zooplanktonic organisms in Sarıyar Dam Reservoir in Turkey. *African Journal of Biotechnology*, 7(**12**), 1972-1977.

Aydın, D. and Ahıska S., 2009. Determination of trophic situation of Sarımsaklı Dam Lake (Kayseri-Turkey). *African Journal of Biotechnology*, 8(**22**), 6295-6300.

Bekleyen, A., 2003. A taxonomical study on the zooplankton of Göksu Dam Lake (Diyarbakır). *Turkish Journal of Zoology*, 27, 95-100.

Bozkurt, A., 2002. Zooplankton of Aslantaş Dam Lake (Osmaniya), PhD Thesis, Çukurova University, Institute of Science, Adana, 68 P.

Bozkurt, A. and Akın, Ş., 2012. Zooplankton fauna of Yeşilırmak

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[DOR: 20.1001.1.15622916.2020.19.5.10.0]

(between Tokat and Black Sea) Hasan Uğurlu and Suat Uğurlu Dam Lakes. *Turkish Journal of Fisheries and Aquatic Sciences*, 12, 777-786.

Braioni, M.G. and Gelmini D., 1983. Rotiferi Monogononti. Guida per il Riconoscimento Delle Specie Animali Delle Acque Interne Italiane, Consiglio Nazionale Delle Ricerche, Verona, 180 P.

Bulut, H. and Saler, S., 2013. Zooplankton of Kalecik Dam Lake (Elazığ-Turkey). *Firat University Science Journal*, 25(**2**), 99-103.

Bulut, H. and Saler, S., 2014. Zooplankton of Beyhan Dam Lake (Elazığ) Turkey. *Turkish Journal of Engineering, Science and Technology*, 9(**1**), 23-28.

Buyurgan, Ö., Altındağ, A. and Kaya M., 2010. Zooplankton community structure of Asartepe Dam Lake (Ankara, Turkey*). Turkish Journal of Fisheries and Aquatic Sciences*, 10, 135-138

Deksne, R., Skute, A. and Meinerte, A., 2011. Seasonal changes in zooplankton community of the Daugava River. *Acta Biologica*, 11(**1**), 61-75.

Dirican, S. and Musul, H., 2008. A study on the zooplankton fauna of Çamlıgöze Dam Lake. *Sakarya University Science Journal*, 12(**1**), 17-21.

Dussart, B., 1967. Les Copepodes des Eaux Continentales d'Europe Occidentale. Tome I, Calanoides et Harpacticoides, N. Boubee et cie, Paris, 500 P.

Dussart, B., 1969. Les Copepodes des Eaux Continentales d'Europe Occidentale. Tome II, Cyclopoides et Biologie, N. Boubee et cie, Paris. 292 P.

Einsle, U., 1996. Copepoda: Cyclopoida, genera Cyclops, Megacyclops, Acanthocyclops. Guides to the identification of the microinvertebrates of the continental waters of the world. No.10. SPB Academic Publishing, 83 P.

Ipek Alış, N. and Saler, S., 2013. Zooplankton of Sürgü Dam Lake (Malatya-Turkey). *Bitlis Eren University Journal of Science*, 2(**1**), 40-44.

Kaya, M. and Altındağ, A., 2007. Zooplankton fauna and seasonal changes of Gelingülü Dam Lake (Yozgat. Turkey). *Turkish Journal of Zoology*, 31, 347-351.

Kiefer, F., 1978. Das zooplankton der binnengewasser 2. Teil. Freilebende Copepoda. Die Binnengewasser Band XXVI E. Schweizerband'sche Verlagbuchhandlung, Stuttgart,343p.

Kök, O., 2005. Seasonal and spatial distribution of zooplankton population in Kapulukaya Dam Lake (Kırıkkale). MSc Thesis, Kırıkkale University Graduate School of Natural and Applied Sciences, Kırıkkale, 64 P.

Kolisko, A., 1974. Plankton rotifers, biology and taxonomy. Die binnengenwasser, Vol. XXVI/I, Suplement, 146 P.

Koste, W., 1978 Rotatoria. uberordnung monogononta. Gebruder Borntraeger, Berlin, Stuttgart. I. Textband, II. Tafelband, 234p.

[Downloaded from jifro.ir on 2026-11-01]

[DOR: 20.1001.1.15622916.2020.19.5.10.0]

Koste, W. and Shiel R.J., 1987. Rotifera from Australian inland waters, Ephiphanidae and Brachionidae (Rotifera: Monogononta). *Invertebrate Taxonomy*, 7, 949-1021.

Magurran, A.E., 2004. Measuring biological diversity. Blackwell Publishing, Oxford, 215p.

Margalef, R., 1958. Information theory in ecology, *Journal of General Systems*, 3, 36-71.

Ramdani, N.M., Elkhiati, R.J., Flower, H.H., Birks, M.M., Ktaiem, A.A. and Patrick, S.T., 2001. Open water zooplankton communities of North African wetland lakes. *Aquatic Ecology*, 35, 319-333.

Nogrady, T. and Segers, H., 2002. Rotifera. Vol: 6: Asplanchnidae, Gastropodidae, Lindiidae, Microcodidae, Synchaetidae, Trochosphaeridae and Filinia. Guides tothe identification of the microinvertebrates of the continental waters of the World, Coordinating Editor: H.J.F. Dumont, No: 18, Backhuys Publishers, Leiden, 264p.

Rylov, V.M., 1963. Fauna of U.S.S.R. Crustacea Vol:III, No:3, Freshwater Cyclopoida., I.P.S.T. Jerusalem, 318 P.

Saler (Emiroğlu), S. and Şen., 2000. Taxonomic investigation of rotifera fauna in Cip Dam Lake (Elazığ). *Fırat University Science and Engineering Sciences Journal*, 12(**1**), 329-339.

Saler, S., 2009. Rotifers of Kepektaş Dam Lake. (Elazığ-Turkey). *Iranian Journal of Science and Technology*, 33, 121-126.

Saler, S., İpek, N. and Eroğlu, M., 2010. Karakaya Baraj Gölü Battalgazi Bölgesi Rotiferleri. *Journal of New World Sciences Academy, Ecological Sciences*, 5(**3**), 216-221.

Saler, S., Haykır, H. and Baysal, N., 2014. Zooplankton of Uzunçayır Dam Lake (Tunceli Turkey). *Journal of FisheriesSciences*, 8(**1**), 1-7.

Saler, S. and Alış, N., 2015. Zooplankton of Hancağız Dam Lake (Gaziantep-Turkey). *Journal of Survey in Fisheries Sciences*, 1(**1**), 36-45.

Sharma, A., Ranga, M. M. and Sharma, P. C. 2010. Water quality status of historical Gundolav lake at Kishangarh as a primary data for sustainable management. *SAJTH*. 3(**2**), 149-158.

Segers, H., 1995. Rotifera. Vol. 2. Thelecaniidae (Monogononta). Guides to the identification of the microinvertebrates of the continental waters of the world. Coordinating Editor: H.J.F. Dumont, SPB Academic Publishing, 226p.

Shannon, C.E and Weaver, W., 1949. The mathematical theory of communication. Urbana, University of Illinois Press, 125p.

Simpson, E.H., 1949. Measurement of diversity. *Nature*, 163, 1-688.

Singh, A.K, Tiwari, R.K, Kanaujia D.R. and Mishra, P., 2002. Physicochemical parameters of Ganga River water at Varanashi. *J. Ecobiol*, 25(**1**), 45-56.

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[DOR: 20.1001.1.15622916.2020.19.5.10.0]

Smirnov, N.N., 1974. Fauna of U.S.S.R. Cruatacea. Chydoridae, Vol: 1, No: 2, I.P.S.T. Jerusalem, 644 P.

Smirnov, N.N., 1992. The Macrothricidae of the world. Guides to the Identification of the microinvertebrates of the continental waters of the World, SPB Academic Publishing, 143 P.

Smirnov, N.N., 1996. Cladocera: The Chydorinae and Sayciinae (Chydoridae) of the World. Guides to the identification of the microinvertebtates of the continental waters of the World, Coordinating Editor: H.J.F. Dumont, No.11.SPB Academic Publishing, 376 P.

Tuna, A., 2009. Researches on zooplankton of Kemer Dam Lake (Aydin). PhD thesis, Ege University Institute of Science, Izmir, 81 P.

Ülgü, M., 2008. Investigation of zooplankton succession in Tahtaköprü Dam Lake. MSc Thesis, Mustafa Kemal University, Institute of Science, Hatay, 50 P.

Yiğit (Atasagun), S., 1998. Investigation of zooplanktonic species and their seasonal changes in Kesikköprü Dam Lake (Ankara), PhD Thesis, Ankara University Institute of Science and Technology, Ankara, 106 P.

[Downloaded from jifro.ir on 2026-11-01]

[DOR: 20.1001.1.15622916.2020.19.5.10.0]