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SHORT COMMUNICATION KISA MAKALE

ZOOPLANKTON OF UZUNÇAYIR DAM LAKE (TUNCELI-TURKEY)

Serap Saler*, Hilal Haykır, Nesrin Baysal

Fırat University Faculty of Fisheries, Elazıg-Turkey

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Abstract: In this research zooplankton distribution of Uzunçayır Dam Lake were determined between March 2010 - February 2011. Zooplankton samples were taken regularly in each month from the dam lake. pH, dissolved oxygen and water temperature values were recorded in situ by using portative equipments. In the dam lake 23 zooplankton species were recorded. All of these species 15 species from Rotifera, 6 species from Cladocera and 2 species from Copepoda were identified. The most attractive species were from Rotifera because of its species richness and number of individuals. Especially in spring months zooplankton were recorded in highest individual numbers and species. Numbers of species diversities were determined high in May (12 species). The study has got an importance as to be the first research on zooplankton in Uzunçayır Dam Lake.

Keywords: Rotifera, Cladocera, Copepoda, Uzunçayır Dam Lake

Öz: **Uzunçayır Baraj Gölü (Tunceli-Tükiye) Zooplanktonu**

Bu araştırmada Uzunçayır Baraj Gölü zooplankton dağılımı Mart 2010-Şubat 2011 tarihleri arasında tespit edilmiştir. Zooplankton örnekleri gölden her ay düzenli olarak alınmıştır. pH, çözünmüş oksijen ve su sıcaklık değerleri portatif aletler kullanılarak arazide kaydedilmiştir. Baraj gölünde 23 zooplankton türü kaydedilmiştir. Bunlardan 15 türün Rotifera, 6 türün Cladocera ve 2 türün Copepoda ya ait oldukları tespit edilmiştir. Rotifera tür zenginliği ve bireylerin sayısı bakımından en dikkat çekici grup olmuştur. Özellikle ilkbahar aylarında zooplankton yüksek birey ve tür sayıları ile kaydedilmiştir. Tür çeşitliliğinin en yüksek Mayıs ayında (12 tür) olduğu belirlenmiştir. Bu çalışma Uzunçayır Baraj Gölü zooplanktonu üzerinde yapılan ilk araştırma olması bakımından önemlidir.

Anahtar Kelimeler: Rotifera, Cladocera, Copepoda, Uzunçayır Baraj Gölü

* **Correspondence to:** **Serap SALER,** Fırat University Faculty of Fisheries, 23119 Elazıg-TURKEY

E-mail: ssaler@firat.edu.tr

Introduction

In Lake Ecosystem, zooplankton occupy the second trophic level of food chain and are important food source for invertebrates and fishes. In addition, they act as indicator of water quality, eutrophication and the level of water pollution (Sharma, 1983; Saksena, 1987; Berzins and Pejler, 1987). A lot of work has been carried out on the zooplankton fauna of Turkey Ozdemir and Sen (1994), Saler and Şen (2002) Bekleyen (2003), Saler (2004, 2009), Kaya and Altındağ (2007), Saler and Şen (2010); Saler *et al* (2011).

However, the zooplankton fauna of Uzunçayır Dam Lake has not been studied before. The present study was therefore conducted to determine the zooplankton composition in Uzunçayır Dam Lake.

Materials and Methods

Uzunçayır Dam Lake is located on Munzur River at the southeastern of Tunceli. Dam Lake was built to produce electric and also fishing was made in dam reservior.

In this research zooplankton distribution of Uzunçayır Dam Lake were determined between March 2010 - February 2011. The zooplankton samples were collected with a standart plankton net (Hydrobios Kiel, 25 cm diameter 55 µm mesh size) horizontal hauls from three stations (Station I 39º09.59"N, 39º30'2.53"; Station II, 38º59'59.56"N, 39º31'1.43"E and station III, 38º58'59.19"K, 39º31'41.06"E) and the specimens were preserved in 4% formaldehyde solution in 100ml plastic bottles.The map of research field was given in fig 1. The species were identified according to Kolisko (Edmondson, 1959; Grasse (1965); Kolisko, 1974; Koste, 1978 a, b; Dumont ve De Ridder 1987). Temperature and dissolved oxygen were measured by an Oxi 315i/SET oxygen-meter, pH by a Lamotte (pH 5-WC) model pHmeter.

Figure 1. The location of Uzunçayır Dam Lake.

Results and Discussion

In Uzunçayır Dam Lake 15 species of Rotifera, 6 species of Cladocera and 2 species of Copepoda were identified and given below.

The montly distribution of Rotifera, Cladocera and Copepoda are given in Uzunçayır Dam Lake (Table 1 and 2). Total Montly distribution of zooplankton fauna is shown in Uzunçayır Dam Lake (Table 3).

S.pectinata the most abundant species was observed for 9 months during the study period and showed its peak May with 6114 ind./m³ while the lowest were recorded in March, September and January with 509 ind./ m³. The second most dominant species was *P. dolichoptera*, which occured in 7 monts. The highest number of this species was recorded in May with 9171 ind./m³, and the lowest in September, November and December with 509 ind.m³.

Phylum: Rotifera	
Classis: Monogononta	
Ordo: Ploimia	*Notholca acuminata* (Ehrenberg, 1832)
Familia: Brachionidae	*Notholca squamula* (O.F.Müller, 1786)
	Kellicottia longispina (Ehrenberg, 1879)
	Keratella cochlearis (Gosse, 1851)
	Keratella quadrata (O.F.Müller, 1786)
Familia: Synchaetidae	*Synchaeta pectinata* Ehrenberg, 1832
	Polyarthra dolichoptera Carlin, 1943
Familia: Asplanchnidae	*Asplanchna priodonta* Gosse, 1850
	Asplanchna sieboldi (Leydig, 1854)
Familia: Gastropodidae	*Ascomorpha saltans* Bartsch,1870
Familia: Trichocercidae	*Trichocerca capucina* Wierzejski-Zacharias, 1893
Familia: Notommatidae	*Cephalodella gibba* (Ehrenberg, 1838)
Familia: Trichotriidae	*Trichotria tetractis* (Ehrenberg, 1830)
Familia: Colurellidae	*Lepadella ovalis* (O.F.Muller, 1786)
Familia: Lecanidae	*Lecane luna* (O.F.Muller, 1776)
Phylum: Arthropoda	
Subphylum: Crustacea	
Classis: Branchiopoda	
Ordo: Cladocera	
Familia: Daphnidae	*Daphnia longispina* O.F. Müller, 1875
	Simocephalus vetulus (O.F. Müller, 1776)
	Ceriodaphnia reticulata (Jurine, 1820)
Familia:Bosminidae	*Bosmina longirostris* (O.F. Müller, 1785)
	Chydorus sphaericus (O.F. Müller, 1776)
Familia: Leptodoridae	*Leptodora kindtii* (Focke, 1844)
Classis Maxillopoda	
Subclassis Copepoda	
Ordo: Calanoida	
Familia: Diaptomidae	*Acanthodiaptomus denticornis* (Wierzejski, 1887)
Ordo: Cyclopoidae	*Cyclops vicinus* Uljanin, 1875

Cyclops vicinus, the Copepoda group was observed for 8 months during the study period. In addition the total zooplankton individual was showed that maximum (5604 ind/m^3) in June. The recorded species than Cladocera group were not demonstrate permanent distribution. *Ceriodaphnia reticulata* was recorded during for 4 months. *Simocephalus vetulus* was recorded in only September.

In Uzunçayır Dam Lake the highest number of zooplankton was recorded in May (21907 individual/m^3) and the least organism in February (2036 individual/m^3)

In Uzunçayır Dam Lake, the highest water temperature was found as 20.1°C in August. In January, the lowest water temperature was recorded as 7.1 °C. In March, the highest value of dissolved oxygen was recorded as 10.1 mg/L. In November, the lowest dissolved oxygen value were recorded 4.6 mg/L. pH value was changed between 6.8 and 8.1. Temperature, dissolved oxygen and pH values of the Uzunçayır Dam Lake were recorded in the field and shown in the Table 4.

Table 1. The montly distribution of Rotifera in Uzunçayır Dam Lake (ind./m³)

	Mar	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.
ROTIFERA												
A. priodonta	-	509	2547	-	1528	-	-	509	1019	509	1019	-
A. saltans	509	-	-	1019	-	-	-	-	-	-	-	-
A.sieboldi	2038	-	-	-	-	-	1019	-	509	-	-	-
C. gibba	-	-	-	-	-	2547	1019	509	-	-	-	509
K. cochlearis	-	-	-	1528	2038	-	509	-	1019	-	1019	-
K.quadrata	-	-	509	-	-	-	-	-	-	-	1019	-
K. longispina	-	-	-	-	-	1528	-	-	-	-	-	-
L. luna	-	509	-	1019	509	-	-	-	509	-	-	-
L.ovalis	-	-	1019	-	509	-	-	-	-	-	-	-
N. acuminata	1019	509	-	-	-	-	-	-	-	1019	-	-
N. squamula	509	-	509	-	-	-	-	509	-	-	-	509
P. dolichoptera	-	1019	9171	5605	-	1019	509	-	509	509	-	-
S. pectinata	509	1019	6114	3057	2547	1019	509	1019	-	-	509	-
T. capucina	-	1019	-	-	-	-	-	-	-	-	-	-
T. tetractis	-	509	-	-	-	509	-	-	509	509	-	509
TOTAL	**4584**	**5093**	**19869**	**12228**	**7131**	**6622**	**3565**	**2546**	**4074**	**2546**	**3566**	**1527**

Table 2. The montly distribution of Cladocera and Copepoda in Uzunçayır Dam Lake (ind./m³)

	Mar	**Apr**	**May**	**June**	**July**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
COPEPODA												
A. denticornis	-	-	-	3057	509	-	-	-	509	-	-	-
C. vicinus	1528	4585	2038	2547	-	-	1019	1019	509	1019	-	-
TOTAL	**1528**	**4585**	**2038**	**5604**	**509**	**-**	**1019**	**1019**	**1018**	**1019**	**-**	**-**
CLADOCERA												
B. longirostris	-	1019	-	-	-	-	-	1019	-	-	-	-
C. reticulata	2038	-	-	509	1019	-	-	-	-	-	509	-
C. sphaeriscus	-	1528	-	-	-	-	509	-	-	-	-	509
D. longispina	-	-	-	-	-	-	-	509	1019	1019	-	-
L.kindtii	-	509	-	1019	-	-	-	-	-	-	-	-
S. vetulus	-	-	-	-	-	-	1019	-	-	-	-	-
TOTAL	**2038**	**3056**	**-**	**1528**	**1019**	**-**	**1528**	**1528**	**1019**	**1019**	**509**	**509**

Table 3. Montly distribution of zooplankton in Uzunçayır Dam Lake

	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb
ROTIFERA	4584	5093	19869	12228	7131	6622	3565	2546	4074	2546	3566	1527
COPEPODA	1528	4585	2038	5604	509	-	1019	1019	1018	1019	-	-
CLADOCERA	2038	3056	-	1528	1019	-	1528	1528	1019	1019	509	509
TOTAL	**8150**	**12734**	**21907**	**18360**	**8659**	**6622**	**5602**	**5093**	**6111**	**4584**	**4075**	**2036**

Table 4. Monthly recorded values of dissolved oxygen, temperature, and pH in Uzunçayır Dam Lake

	Monhts											
Parameters	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
Dis.Oxygen mg/L	10.1	5.2	4.9	4.8	5.2	4.7	4.8	4.9	4.6	7.4	6.2	6.3
Temperature C°	11.6	12.4	18.6	17.5	16.3	20.1	15.9	15.8	11.3	8.6	7.1	7.7
pH	8.1	7.4	7.3	7.3	7.3	7.2	7.1	7.1	7.2	7.3	7.5	6.8

Rotifers are regarded as bioindicators of water quality (Sladecek, 1983; Saksena, 1987) and high rotifer density has been reported to be a characteristic of eutrophic lakes (Sendacz, 1984).

In eutrophic lakes, permanent dominant rotifer species have been reported, such as Brachionus and Keratella (Tanyolac, 1993). In Uzunçayır Dam Lake, the Rotifera group was more dominant than the other two groups.

According Segers (2007), all the recorded rotifer species in the present study are widely distributed around the world. Also many of the recorded species are common in Turkey (Kaya and Altındağ, 2007; Kaya *et a*l., 2007). Only six species of Cladocera were observed in Uzunçayır Dam Lake. Among them *B.longirostris* and *C.sphaeriscus* are cosmopolitan species (Buyurgan *et al*., 2010). The ecological features of the recorded species show that most of them are cosmopolitan and littoral inhabiting (Kolisko, 1974).

Additionally, among the recorded species, *B. longirostris* and *C. vicinus*, *P. dolichoptera*, *K.cochlearis* are well known indicators of eutrophy (Ryding and Rast, 1989; Haberman, 1998). *D. longispina*, and *C. sphaericus*, of the Cladocera group, were dominant in the lake; however, these species are generally found in eutrophic lakes (Berzins and Bertilson, 1989). All of these species were recorded in the dam lake.

Saler and Haykır (2011) reported there was a marked decrease in total zooplankton species richness and individual number in winter and a sharp increase in spring and summer months in Pulumur Stream. Similar results have been reported in this study.

Saler (2011), reported 11 zooplankton species from Munzur River. Uzunçayır Dam Lake was built on Munzur River and in the dam lake 23 zooplankton species were identified.

Saksena (1987), mentioned Rotifers as the dominant zooplankton in in freshwater ecosystems. In Uzunçayır Dam Lake Rotifers were found in every season.

Saler *et al.* (2000), in Euphrates River, Saler and Sen (2001), in Zıkkım Stream emphasized that, rotifers were observed maximum numbers in spring. Zooplanktonik organisms have been recorded in high individual numbers over the period of the spring in the present study.

Güher and Erdoğan (2005), have reported spring and summer rotifer maksimums from Gala Lake. In Kesikköprü Dam Lake Yigit (2006), observed rotifers in greater number in spring and autumn than in other seasons. Seasonal distribution of rotifer fauna of Uzunçayır Dam Lake is shown an agreement with the findings of Güher and Erdogan (2005).

Rotifer species belonging to the family Brachionidae species that were observed in Gumuldur Stream by Ustaoglu *et al*. (1996) have showed similarities to that recorded in Uzunçayır Dam Lake.

Ipek and Saler (2008), found rotifers as the most abundant species in spring period in Seli Stream. They emphasized Brachionidae species of rotifers as the most observed family as in Uzunçayır Dam Lake.

pH is significantly effective on distribution of zooplankton in terms of zooplankton density Limit pH value for zooplankton is reported as 8.5

(Berzins and Pejler, 1987). Dam lake pH value ranged within normal limits.

Temperature is one of the most important factors affecting the distribution of rotifers (Kolisko, 1974). In parallel with the increase of temperature the embryonal development time of rotifer species is getting shorter and consequently to this they reproduce in a short time period. This finding explains the reason of existence of rotifer species in the highest density in spring and summer in Uzunçayır Dam Lake

Conclusion

The zooplankton of Uzunçayır Dam Lake consist mainly of Cladocera, Copepoda and Rotifera groups. Uzunçayır Dam Lake 23 zooplankton species were recorded. Dam Lake were represented with 15 Rotifers species. Rotifera showed higher diversity compared to other groups, reaching also high densities throughout the study period.

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