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## The Rotifer Fauna of Lake Sazlıgöl (Menemen – İzmir)

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**Abstract:** With the aim of identifying the rotifer fauna of Lake Sazlıgöl, samples were collected monthly between February 1998 and July 1999, using a plankton net with a mesh size of 60 µm, and were preserved in 4% formaldehyde.

As a result, 47 taxa in 11 families were identified, and *Asplanchnopus multiceps* and *Notholca salina* are new recorded species for Turkish inland water fauna.

**Key Words:** Rotifera, Lake Sazlıgöl, İzmir

### Sazlıgöl'ün (Menemen- İzmir) Rotifer Faunası

**Özet:** Sazlıgöl'ün rotifer faunasını belirlemek amacıyla, Şubat 1998 - Temmuz 1999 tarihleri arasında aylık periyotlarla, 60 µm göz açıklığındaki keçeçeler kullanılarak toplanan örnekler % 4 lük formolde tespit edilmiştir.

Örneklerin kalitatif değerlendirilmesi sonucunda, 11 familyaya ait 47 takson saptanmış olup *Asplanchnopus multiceps* ve *Notholca salina* Türkiye içsu faunası için yeni kayıttır.

**Anahtar Sözcükler:** Rotifera, Sazlıgöl, İzmir

### Introduction

At a time in, which environmental awareness is increasing by degrees, one of the necessary conditions for combatting pollution is the definition of biological diversity, because change in biological diversity is one of the best sources of data about the level of pollution.

Some species of rotifers, which are very important for the food chain are indicative of the quality and eutrofication states of the water in which they live.

Zooplanktonic research has been performed on the zooplankton faunas of Lake Gölçük (Geldiay and Tareen, 1972; Tareen, 1974; Özdemir Mis, 1998), Lake Karagöl (Ustaoğlu, 1986), Lake Kuş (Ustaoğlu and Balık, 1990a), Lake Gebekirse (Ustaoğlu and Balık, 1990b), Lake Marmara (Ustaoğlu, 1993) and some rivers of the North Aegean (Balık et al., 1999), and the rotifer faunas of Lake Akgöl (Ustaoğlu and Balık, 1987) and Gümüldür Stream (Ustaoğlu et al., 1996) were identified.

Although there has been some research on the benthic fauna (Balık et al., 2001) and microcrustacean fauna

(Ustaoğlu et al., 2003) of Lake Sazlıgöl, near which construction has begun and which is faced with pollution, there is no other research on the rotifer fauna there. Therefore, this study was carried out with the aim of identifying the rotifer fauna of Lake Sazlıgöl, which is located in the Gediz River delta, and of contributing to Turkish inland water fauna.

### Materials and Methods

With the aim identifying the rotifer fauna of Lake Sazlıgöl, plankton samples were collected monthly between February 1998 and July 1999. Specimens were collected with a plankton net with a mesh size of 60 µm, and were fixed in 4% formaldehyde for investigation.

The taxonomical investigations of samples were performed according to the key given by Ruttner-Kolisko (1974), Voigt and Koste (1978) and Segers (1995).

Water temperatures were measured with a thermometer sensitive to 0.1 °C. pH and conductivity measurements were performed with a HANNA 8014 pH

meter and a HANNA 8033 conductivimeter. Dissolved oxygen concentrations were measured according to Winklers method. Salinity analysis was performed according to the Mohr-Knudsen method. In vivo chlorophyll-a was measured fluorometrically with a Turner 10 AU fluorometer; nitrite, nitrate, ammonium, phosphate and silicate analyses were done spectrophotometrically under laboratory conditions (Strickland and Parsons, 1972; Wood, 1975; Parsons et al., 1984).

### The Characteristics of the Research Area

Lake Sazlıgöl is located at 38° 35' 54" N, and 26° 54' 20" E in the Gediz River delta in Menemen-İzmir (Figure).

Being small in volume and shallow the lake waters are affected by environmental factors (light, temperature, rain, etc.). Due to decreases in water volume, especially in summer, the lake is covered with vegetation.

During the 17 months of the research it was determined that the surface water temperature in the lake ranged from 11.0 to 32.5 °C, dissolved oxygen concentrations from 4.2 to 16.0 mg/l, pH from 7.42 to 8.84, salinity from 1.11 ‰ to 2.41 ‰, and chlorophyll-a from 2.02 to 13.56 mg/m<sup>3</sup>. Among nutrients, NO<sub>2</sub><sup>-</sup>-N at 0-155.40 µg/l, NO<sub>3</sub><sup>-</sup>-N at 2.94-1883.00 µg/l, NH<sub>4</sub><sup>+</sup>-N at 0-668.92 µg/l, PO<sub>4</sub><sup>-3</sup>-P at 1.24-274.97 µg/l and SiO<sub>2</sub><sup>=</sup>-Si at 215.32-6490.40 µg/l were measured.

### Results and Discussion

As a result of qualitative determinations, 11 families, 19 genera, 37 species and 8 subspecies were identified. Classifications of these taxa according to Parker (1982) are as follows:

**PHYLUM: ROTIFERA**

Classis: Monogononta

Ordo: Ploima

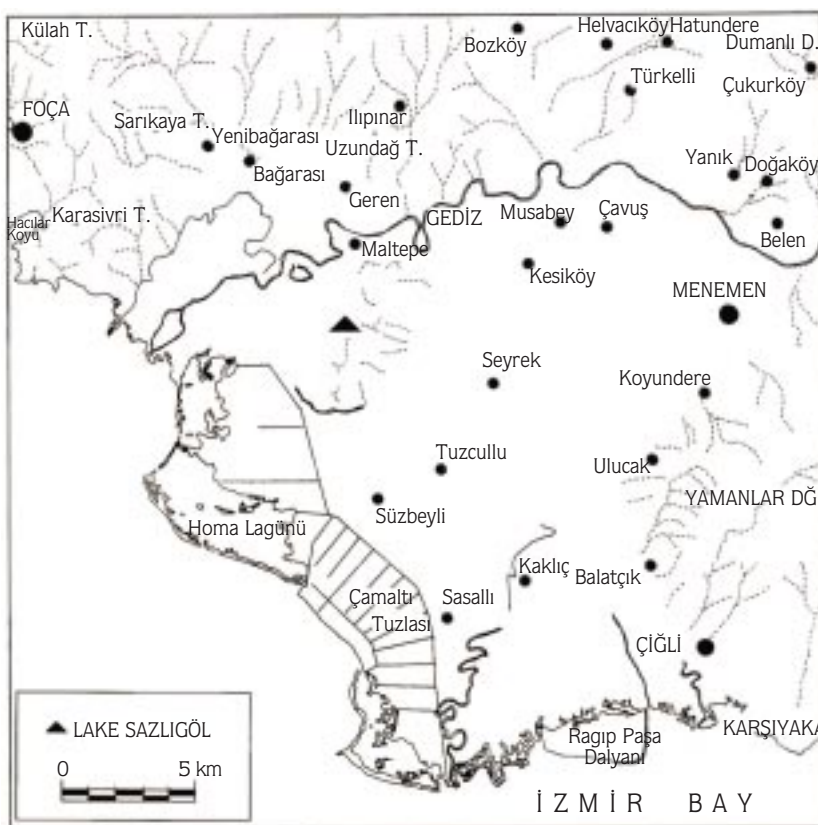


Figure. Lake Sazlıgöl.

## Familia: Brachionidae

- Brachionus plicatilis* (O.F. Müller, 1786)  
*Brachionus quadridentatus* Hermann, 1783  
*Brachionus patulus*, (O.F. Müller, 1786)  
*Platyias quadricornis* (Ehrenberg, 1832)  
*Keratella quadrata* (Müller, 1786)  
*Anuraeopsis fissa* (Gosse, 1851)  
*Notholca acuminata* (Ehrenberg, 1832)  
*Notholca salina* (Focke, 1961)

## Familia: Mytilinidae

- Mytilina ventralis* (Ehrenberg, 1832)  
*Mytilina ventralis macracantha* (Gosse, 1886)  
*Mytilina ventralis brevispina* (Ehrenberg, 1832)  
*Mytilina mucronata* (O.F. Müller, 1773)  
*Lophocaris salpina* (Ehrenberg, 1834)

## Familia: Trichotriidae

- Trichotria pocillum* (O.F. Müller, 1776)  
*Trichotria tetractis* (Ehrenberg, 1830)

## Familia: Colurellidae

- Colurella* sp.  
*Lepadella patella* (O.F. Müller, 1786)  
*Lepadella patella similis* (Lucks, 1912)  
*Lepadella ovalis* (O.F. Müller, 1786)  
*Lepadella triptera* (Ehrenberg, 1830)  
*Lepadella acuminata* (Ehrenberg, 1834)

## Familia: Euchlanidae

- Euchlanis dilatata* (Ehrenberg, 1832)  
*Euchlanis dilatata lucksiana* (Hauer, 1930)  
*Euchlanis dilatata unisetata* (Leydig, 1854)  
*Euchlanis incisa* Carlin, 1939  
*Euchlanis contorta* Wulfert, 1939

## Familia: Lecanidae

- Lecane luna* (O.F. Müller, 1776)  
*Lecane ohioensis* (Herrick, 1885)  
*Lecane papuana* (Murray, 1913)  
*Lecane imbricata* Carlin, 1939  
*Lecane grandis* (Murray, 1913)  
*Lecane (M.) bulla* (Gosse, 1886)  
*Lecane (M.) closteroerca* (Schmarda, 1859)  
*Lecane (M.) quadridentata* (Ehrenberg, 1832)  
*Lecane (M.) lunaris* (Ehrenberg, 1832)  
*Lecane (M.) lunaris perplexa* (Ahlstrom, 1938)  
*Lecane (M.) hamata* (Stokes, 1896)

## Familia: Notommatidae

- Scaridium longicaudum* (O.F. Müller, 1786)  
*Cephalodella* sp.

## Familia: Trichocercidae

- Trichocerca rattus* (O.F. Müller, 1776)  
*Trichocerca rattus carinata* (Ehrenberg, 1830)  
*Trichocerca tenuior* (Gosse, 1886)

## Familia: Synchaetidae

- Polyarthra vulgaris* Carlin, 1943

## Familia: Asplanchnidae

- Asplanchna sieboldi* (Leydig, 1854)  
*Asplanchnopus multiceps* (Schrank, 1793)

## Familia: Testudinellidae

- Testudinella patina* (Hermann, 1783)  
*Testudinella patina intermedia* Anderson, 1889

While examining the monthly distributions of samples collected from Lake Sazlıgöl, which are given in the Table, the most rotifers were found in June, 1998, (22 taxa) and the least were found in March, 1998, (2 taxa). While

*Mytilina mucronata*, *Lecane luna* and *Testudinella patina* were determined for the 17 months of the study period, *Brachionus plicatilis*, *Keratella quadrata*, *Notholca salina*, *Lecane ohioensis*, *Lecane papuana*, *Lecane imbricata*,

*Lecane grandis*, *Lepadella triptera*, *Lepadella acuminata*, *Trichocerca tenuior*, *Asplanchna sieboldi*, *Asplanchnopus multiceps* and *Trichotria tetractis* were observed in only 1 month.

Table. The monthly distribution of rotifers identified from Lake Sazlıgöl.

Taxa	1998										1999						
	F	M	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J
<i>Brachionus plicatilis</i>													+				
<i>Brachionus quadridentatus</i>				+	+	+			+							+	+
<i>Brachionus patulus</i>							+	+	+						+	+	+
<i>Platylabus quadricornis</i>	+	+		+	+								+				
<i>Keratella quadrata</i>	+																
<i>Anuraeopsis fissa</i>				+		+					+			+			
<i>Notholca acuminata</i>	+												+				
<i>Notholca salina</i>													+				
<i>Mytilina mucronata</i>	+	+	+			+	+	+	+	+	+	+	+		+	+	+
<i>Mytilina ventralis</i>				+		+			+						+	+	
<i>Mytilina ventralis brevispina</i>				+	+		+	+	+				+	+	+	+	
<i>Mytilina ventralis macracantha</i>				+					+		+		+		+	+	+
<i>Lophocaris salpina</i>			+	+							+						+
<i>Trichotria pocillum</i>				+					+			+					
<i>Trichotria tetractis</i>				+													
<i>Colurella</i> sp.															+		
<i>Lepadella patella</i>				+		+								+		+	+
<i>Lepadella patella similis</i>			+						+			+					
<i>Lepadella triptera</i>														+			
<i>Lepadella ovalis</i>			+	+													
<i>Lepadella acuminata</i>													+				
<i>Euchlanis dilatata</i>			+	+	+			+				+	+	+	+	+	+
<i>Euchlanis dilatata lucksiana</i>				+					+								
<i>Euchlanis dilatata unisetata</i>						+								+			
<i>Euchlanis incisa</i>				+			+	+	+			+		+	+	+	+
<i>Euchlanis contorta</i>									+								
<i>Lecane luna</i>			+	+	+	+	+	+	+	+	+	+		+	+	+	+
<i>Lecane hamata</i>				+							+						+
<i>Lecane ohioensis</i>									+								
<i>Lecane papuana</i>			+														
<i>Lecane imbricata</i>										+							
<i>Lecane grandis</i>												+					
<i>Lecane (M.) bulla</i>						+	+	+						+	+		
<i>Lecane (M.) quadridentata</i>			+	+			+	+			+		+	+	+	+	+
<i>Lecane (M.) closterocerca</i>			+						+	+	+						
<i>Lecane (M.) lunaris</i>									+			+	+	+			+
<i>Lecane (M.) lunaris perplexa</i>				+										+			
<i>Scardium longicaudum</i>				+	+												+
<i>Cephalodella</i> sp.			+								+						
<i>Trichocerca rattus</i>		+	+					+		+	+	+		+	+		
<i>Trichocerca rattus carinata</i>				+					+								+
<i>Trichocerca tenuior</i>															+		
<i>Polyarthra vulgaris</i>						+						+		+			
<i>Asplanchna sieboldi</i>						+											
<i>Asplanchnopus multiceps</i>									+								
<i>Testudinella patina</i>			+	+	+		+	+	+	+	+	+	+	+	+		+
<i>Testudinella patina intermedia</i>								+				+	+		+		

Due to a lack of research in Lake Sazlıgöl, all of these taxa have only now been reported from this lake. In addition, when we investigated the check-lists of Dumont and De Ridder (1987), Emir (1999, 2001) and Altındağ (2001), it transpired that *Asplanchnopus multiceps* and *Notholca salina* are new species for Turkish inland water fauna.

To compare this study with the research conducted at Lake Gebekirse, Lake Kuş, Lake Marmara and Lake Akgöl, which are plain lakes like Lake Sazlıgöl, only 4 species (*Brachionus quadridentatus*, *Keratella quadrata*, *Notholca acuminata* and *Lecane luna*) out of 11 species identified from Lake Gebekirse were also identified from Lake Sazlıgöl. That is because Lake Gebekirse is deeper and saltier than Lake Sazlıgöl (Ustaoğlu and Balık, 1990b).

Similar to this study, although there are specimens from the families Brachionidae, Trichocercidae, Synchaetidae and Asplanchnidae in Lake Kuş, only *Keratella quadrata* was found among the 15 rotifers in both of the lakes (Ustaoğlu and Balık, 1990a).

With regard to Lake Akgöl, there are 11 species and 3 genera similar to those in Lake Sazlıgöl (Ustaoğlu and Balık, 1987). Although Lake Akgöl is covered with reeds and weeds, like Lake Sazlıgöl, it is deeper and cooler than it. Therefore, the salinity level is higher in Lake Sazlıgöl, and so species which prefer low salinity, such as *Brachionus plicatilis*, *Notholca salina*, *Mytilina mucronata*, *Lophocaris salpina* and *Lecane (M.) closteroerca*, can be found there.

In Lake Marmara, 7 species and 4 genera, totalling 11 taxa out of 18, are similar to those in Lake Sazlıgöl (Ustaoğlu, 1993). Lake Marmara also differs with regard to physico-chemical parameters such as depth, temperature and dissolved oxygen concentration.

Lake Sazlıgöl is distinguished from the other lakes by such characteristics as its shallowness, high dissolved oxygen concentration ranges, narrow temperature ranges and heavy vegetation. More rotifers were therefore identified in this lake than in the other lakes.

Lake Sazlıgöl, which has a great many macrophytes, constitutes a very good habitat for *Euchlanis dilatata*, *Trichotria pocillum*, *Lecane ohioensis*, *Lecane quadridentata*, *Lecane hamata* and *Scaridium longicaudum*.

In accordance with the salinity values, the presence of light saline and brackish water forms such as *Brachionus quadridentatus*, *Brachionus plicatilis*, *Platyias quadricornis*, *Keratella quadrata*, *Notholca salina*, *Mytilina mucronata*, *Lophocaris salpina*, *Lecane luna*, *Lecane bulla*, *Lecane quadridentata*, *Lecane closteroerca* and *Testudinella patina* is to be expected.

When chlorophyll-a and nutrient values measured in Lake Sazlıgöl are investigated and the existence of members of the family Brachionidae, such as *Euchlanis dilatata*, *Mytilina mucronata*, *Lepadella ovalis*, *Lepadella patella*, *Scaridium longicaudum* and *Trichocerca tenuior*, is considered, it is evident that Lake Sazlıgöl is eutrophic.

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