



Zooplankton Fauna of Some Temporary Volcanic Lakes in Gaziantep

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ABSTRACT

Zooplankton species diversity of four temporary lakes around Tahtaköprü Dam Lake (Gaziantep) has been determined within the provincial borders of Gaziantep. During the study, a total of 29 species (18 belonging to Rotifera, 8 to Cladocera and 3 to Copepoda) were identified in the study area. It was determined that the zooplankton fauna of the lakes consist of the same species and the amounts of all species were abundant.

Keywords: Gaziantep, temporary lakes, zooplankton

ARTICLE INFO

SHORT COMMUNICATION

Geliş : 16.11.2017

Düzeltilme : 11.07.2018

Kabul : 20.07.2018

Yayın : 17.08.2018



DOI:10.17216/LimnoFish.354205

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Gaziantep'te Bazı Geçici Volkanik Göllerin Zooplankton Faunası

Öz: Gaziantep il sınırları içerisindeki Tahtaköprü Baraj Gölü (Gaziantep) civarında bulunan dört geçici gölün zooplankton tür çeşitliliği belirlenmiştir. Çalışma alanında toplam 29 zooplankton türü (18'i Rotifera, 8'i Kladosera ve 3'ü Kopepoda'ya ait) tespit edilmiştir. Çalışmada, göllerin zooplankton içeriğinin aynı türlerden oluştuğu ve tüm türlerin miktarlarının bol olduğu belirlenmiştir.

Anahtar kelimeler: Gaziantep, geçici göller, zooplankton

Alıntılama

Bozkurt A, Genç MA. 2018. Zooplankton Fauna of Some Temporary Volcanic Lakes in Gaziantep. LimnoFish. 4(2): 118-121. doi: 10.17216/LimnoFish.354205

Introduction

Temporary wetlands are ecosystems that contain water during periods that can vary from a few months to several years (Schwartz and Jenkins 2000), thus constituting reservoirs of species adapted to these harsh environmental conditions. They usually develop in shallow depressions, and their size can vary from a few square meters to hundreds of hectares (Williams 1987; Schwartz and Jenkins 2000). Several authors have studied some aspects of the alternation of wet and dry phases and their influence on the biota of temporary or episodic environments in various ecosystems in the world (Williams et al. 1998; Bayly 2001; Roshier et al. 2001).

It is well known that there is an inverse relationship between richness and abundance of zooplankton and the concentration of total dissolved solids (Hammer 1986; Green 1993;

Williams et al. 1998; Hall and Burns 2001; Ivanova and Kazantseva 2006), due to the increasing environmental stress produced by the increase in salinity (Herbst 2001), but in saline lakes, biomass tends to be higher due to the occurrence of large-sized zooplankton species that can thrive since the environmental stress causes lack of fishes (Evans et al. 1996).

Zooplankton is very important in aquatic ecosystem because freshwater is a vital component of food webs. The smallest zooplankton are eaten by the larger zooplankton which, in turn, are eaten by small fish, aquatic insects and so on. In addition to these, herbivorous zooplankton graze on phytoplankton or algae, and help maintain the natural balance of algae. This study was conducted to increase the knowledge on the zooplankton fauna of temporary lakes in Turkey since there were not enough studies.

Material and Methods

The specimens were collected from 4 temporary lakes (36° 50' 37" N, 36° 39' 03" E) (Figure 1) by using a plankton net with 60 µm mesh size. The net was hauled vertically from the bottom to the surface in the lakes in March 2007, April 2007, August 2007, January 2008 and March 2016, and then samples were replaced into glass jar. Sampling was not made due to lack of water in lakes in September 2007, October 2007 and August 2016. The samples were fixed with 4% buffered formaldehyde. The zooplankton species examination was done using an Olympus CH40 microscope. To identify the species the works of Ruttner-Kolisko (1974), Koste (1978), Segers (1995), Scourfield and Harding (1966), Smirnov (1974), Negrea (1983), Korinek (1987), Pennak (1989), Borutsky (1964), Dussart (1969), Damian-Georgescu (1970), and Kiefer (1978) were reviewed. All the lakes are within approximately 400 meters and they are 377 m above the sea level. They have a maximum depth of 6 m (B), 5 m (A), 3 m (C), 2 m (D), and a surface area of 5000 m², 6250 m², 1250 m² and 2500 m² respectively. The lakes are located near an old volcano called Koruhöyük (Ersoy 2013), and the volcanic rocks still preserve the form. The lakes are formed in the pits formed by the volcanic rocks.



Figure 1. Locations of Lakes and Sampling stations

Result

Out of total 29 taxa, 18 belong to Rotifera, 8 to Cladocera and 3 to Copepoda. A total of 5 sampling were conducted in the study. *Lecane closterocerca* (Schmarda, 1859), *Pompholyx sulcata* Hudson, 1885, *Testudinella patina* (Hermann, 1783), *Bosmina longirostris* (Müller, 1785) and *Chydorus sphaericus* (Müller, 1776) were found in 4 sampling time but *Asplanchna sieboldii* (Leydig, 1854), *Brachionus budapestinensis* Daday, 1885, *Keratella tropica* (Apstein, 1907), *Keratella quadrata* (Müller, 1786), *Lecane ohioensis* (Herrick, 1885), *Lepadella patella* (Müller, 1773), *Trichocerca stylata* (Gosse, 1851), *Ceriodaphnia reticulata* (Jurine, 1820), *Ceriodaphnia pulchella* Sars, 1862, *Moina micrura*

Kurz, 1874 were found in only one sampling time. Detected five families from Rotifera, Brachionidae was the most species rich family with 8 species followed by Lecanidae with 6 species. Trichocercidae and Asplanchnidae had the least species, followed by Testudinellidae with 2 species. Four family were detected from Cladocera, Daphnidae was the most species rich family with 4 species followed by Chydoridae with 2 species, and Bosminidae and Moinidae families each one had 1 species. In the Copepoda with two families, Cyclopoidae had 2 species and Diaptomidae had 1 species. All species in the study were abundant but *Brachionus calyciflorus* Pallas, 1766, *Keratella cochlearis* (Gosse, 1851), *K. quadrata*, *K. tecta* (Gosse, 1851), *K. tropica*, *T. patina*, *C. reticulata*, *C. pulchella*, *Daphnia magna* Straus, 1820, *C. sphaericus*, *M. micrura*, *Cyclops vicinus* Uljanin, 1875 and *Arctodiaptomus similis* (Baird, 1859) were over-abundant at all sampling times in the lakes. The lesser found species were *Anuraeopsis fissa* Gosse, 1851, *L. closterocerca*, *L. ohioensis*, *L. unguolata* (Gosse, 1887) and *Simocephalus vetulus* (Müller, 1776).

Discussion

Almost all species detected in the study were cosmopolites with wide distribution. *Brachionus angularis* Gosse, 1851, *B. budapestinensis* Daday, 1885, *B. calyciflorus* Pallas, 1766, *Keratella cochlearis*, *K. quadrata*, *K. tecta*, *K. tropica*, *Lecane bulla* (Gosse, 1886), *L. patella*, *T. patina* (Hermann, 1783), *B. longirostris*, *S. vetulus*, *C. rectangulara* (Sars, 1862), *C. sphaericus*, *C. vicinus*, are reported to be found in many aquatic environment and cosmopolite species and have wide distribution area (Eldredge and Evenhuis 2003; Hutchinson 1967; Ruttner-Kolisko 1974; Braioni and Gelmini 1983; Ramdani et al. 2001). *C. abyssorum* Sars, 1863 and *Cyclops vicinus* appear in lakes, rivers, marshes, littoral zone in all types aquatic environment such as small waters and prefer warm waters (Dussart 1969). According to Koste (1978), some of *Brachionus* species (*B. angularis*, *B. budapestinensis*, *B. calyciflorus*) prefer warmer zone and are frequent in trophic and subtrophic waters.

It is thought that due to lack of fish and other planktivorous organisms in the lakes, the abundance of zooplankton were high.

Although Tahtaköprü Dam Lake is about 3.4 km away from the sampling area, it has been determined that species content is quite different. Ülgü and Bozkurt (2015) reported 44 zooplankton species in the Tahtaköprü Dam Lake, but only 16 taxa of these species were found in the study area. On the other hand, thirteen of the species (*Anuraeopsis fissa*,

Lecane bulla, *L. ohioensis*, *L. unguolata*, *L. patella*, *T. patina*, *T. stylata*, *A. sieboldii*, *C. reticulata*, *D. magna*, *S. vetulus*, *C. abyssorum*, *A. similis*) in the study area have not been reported in Tahtaköprü Dam Lake. Some taxa [*Rotaria neptunia* (Ehrenberg, 1832), *B. leydigi* Cohn, 1862, *B. quadridentatus* Hermann, 1783, *B. urceolaris* (Müller, 1773), *Notholca squamula* (Müller, 1786), *Euchlanis dilatata* Ehrenberg, 1832, *Cephalodella gibba* (Ehrenberg, 1838), *Trichocerca* sp., *Synchaeta* sp., *Polyarthra dolichoptera* Idelson, 1925, *P. vulgaris* Carlin, 1943, *Asplanchna girodi* (de Guerne, 1888), *Hexarthra mira* (Hudson, 1871), *Filinia longiseta*

(Ehrenberg, 1834), *F. opoliensis* (Zacharias, 1898), *Collotheca pelagica* (Rousselet, 1893), *Diaphanosoma birgei* Korinek, 1981, *Daphnia* sp., *Macrothrix laticornis* (Fischer, 1851), *Pleuroxus aduncus* (Jurine, 1820), *Leydigia leydigi* (Schoedler, 1863), *Eucyclops speratus* (Lilljeborg, 1901), *Diacyclops bicuspidatus* (Claus, 1857), *Cryptocyclops bicolor* (G.O.Sars, 1863), *Mesocyclops leuckarti* (Claus, 1857), *Thermocyclops crassus* (Fischer, 1853), *Lernaea cyprinacea* Linnaeus, 1758, *Bryocamptus minutus* (Claus, 1863)] were found in Tahtaköprü Dam Lake (Ülgü and Bozkurt 2015) but they were not found in the sampling area.

Table 1. The identified zooplankton species of the studied lakes.

Family	Species	2007			2008	2016	
		Marc.	Apr.	Aug.	Janu.	Marc.	
ROTIFERA	Brachionidae	<i>Anuraeopsis fissa</i>	-	+	+	-	-
		<i>Brachionus angularis</i>	-	+	+	+	-
		<i>B. budapestinensis</i>	-	-	+	-	-
		<i>B. calyciflorus</i>	-	+	+	+	-
		<i>Keratella cochlearis</i>	+	+	-	-	-
		<i>K. quadrata</i>	-	-	-	-	+
		<i>K. tecta</i>	+	+	+	-	-
		<i>K. tropica</i>	-	-	+	-	-
	Lecanidae	<i>Lecane bulla</i>	+	-	+	-	+
		<i>L. closterocerca</i>	+	+	+	-	+
		<i>L. luna</i>	-	+	+	-	+
		<i>L. ohioensis</i>	-	-	+	-	-
		<i>L. unguolata</i>	-	+	+	-	-
	Lepadella patella		-	-	+	-	-
Testudinellidae	<i>Pompholyx sulcata</i>	+	+	+	+	-	
	<i>Testudinella patina</i>	+	+	+	-	+	
Trichocercidae	<i>Trichocerca stylata</i>	-	-	+	-	-	
Asplanchnidae	<i>Asplanchna sieboldii</i>	+	-	-	-	-	
CLADOCERA	Daphnidae	<i>Ceriodaphnia reticulata</i>	+	-	-	-	-
		<i>C. pulchella</i>	-	-	-	+	-
		<i>Daphnia magna</i>	+	-	-	-	+
		<i>Simocephalus vetulus</i>	+	+	-	-	-
	Chydoridae	<i>Coronatella rectangula</i>	+	+	-	-	-
		<i>Chydorus sphaericus</i>	+	+	+	-	+
	Bosminidae	<i>Bosmina longirostris</i>	+	+	+	+	-
Moinidae	<i>Moina micrura</i>	+	-	-	-	-	
COPEPODA	Cyclopoidae	<i>Cyclops abyssorum</i>	-	+	-	-	+
		<i>C. vicinus</i>	-	-	-	+	+
	Diaptomidae	<i>Arctodiaptomus similis</i>	+	+	-	+	-

It is thought that the difference between the zooplankton structure of Tahtaköprü Dam Lake and volcanic lakes may be due to differences in sampling time or water quality effect of volcanic rocks.

Distribution of the species was quite closely related to the ecological characteristics of the species and all species in the study could be found in tropical and subtropical climate zones, such as found in the study.

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