

## Zooplankton Composition of Pulumur Stream (Tunceli-Turkey)

Serap Saler and Hilal Haykir  
Faculty of Fisheries, Firat University, 23119 Elazig, Turkey

**Abstract:** This study was completed with periodical surveys in Pulumur stream between November 2009-October 2010 period. During the study, a total of 21 species (15 belonged to genus of *Rotifera*, 4 to *Copepoda* and 2 *Cladocera*) were found in Pulumur stream. All of the zooplanktonic species have been detected for the first time in Pulumur stream. Also some water parameters (pH, dissolved oxygen, electrical conductivity and water temperature) were measured during field trips.

**Key words:** Zooplankton, rotifera, cladocera, copepoda, Pulumur stream, Turkey

### INTRODUCTION

In aquatic ecosystems, zooplanktonic organisms constitute the foods of invertebrates, fish and sometimes birds. They are the second most important energy transformation ring and the source of food after phytoplankton. Copepods turn the phytoplankton to animal protein rapidly. Due to the reactions that cladocers show to environmental changes, some of their species have been the subject of researches. Since some species of rotifers play a role as indicators in determining the water quality, eutrophication and water contamination levels. Zooplankton is very important in terms of fish culture and fishery in aquatic ecosystems (Berzins and Pejler, 1987; Mikschi, 1989; Saksena, 1987).

Many studies were carried out on zooplanktonic organisms in Turkey. But especially in lotic waters in Turkey a few studies are conducted (Akbulut and Yildiz, 2005; Ozbay and Altindag, 2009) so we carried out this study to explain the zooplankton fauna of Pulumur stream and to discuss the species composition and species richness. The present study is the first survey of zooplankton in Pulumur stream.

### MATERIALS AND METHODS

The zooplankton samples were collected with a standard plankton net (Hydrobios Kiel, 25 cm diameter and 55 µm mesh size) through vertical and horizontal hauls. Sampling was performed between November 2009-October 2010 period four stations which were defined to characterize whole Pulumur stream (Table 1).

Zooplankton species were first examined in general under an inverted microscope and then the species

Table 1: Coordinates of stations in Pulumur stream

Station	Location
I	39°06'06.09"N 39°33'28.51"E
II	39°06'07.46"N 39°34'36.61"E
III	39°06'17.89"N 39°36'29.65"E
IV	39°08'57.86"N 39°39'15.23"E

were diagnosed under a Nikon Eclipse 80 i microscope. For diagnosis, Koste (1978a, b), Nogrady and Pourriot (1995), Segers (1995), De Smet (1996), De Smet and Pourriot (1997) were referenced. Temperature and oxygen were measured with Oxi 315i/SET oxygen meter, pH with Lamotte (pH 5-WC) pH meter.

Pulumur stream borns from the Avci mountain and joins to Munzur river in the borders of Tunceli city centre. The stream starts flowing from 20 km North of Tunceli-Pulumur highway to Pulumur in an narrow river valley and the two sides of the stream is rich in terms of forest cover as well as waterfalls, rocky slopes and canyons.

### RESULTS AND DISCUSSION

In all, 21 species were found in stream, including 15 rotifera, 4 cladocera and 2 copepoda. Based on the number of individuals rotifers were the dominant group in the stream (82.06%) followed by cladocera (11.64%) and copepoda (6.3%). The dominant Rotifera species was *Keratella cochlearis* followed by *Polyarthra dolichoptera*. The dominant Cladocera species were *Bosmina longirostris* followed by *Ceriodaphnia reticulata*. Dominant Copepoda species were *Cyclops vicinus*. Monthly distribution of in the zooplankton groups are shown in Table 2. Temperature, dissolved oxygen and pH values of the Pulumur stream were recorded in the field and shown in Fig. 1.

Table 2: Monthly distribution of zooplankton species in Pulumur stream

Species	Stations/months (1234)											
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.
<b>Rotifera</b>												
<i>Philodina roseola</i>	---	---	---	---	--+	+++	--+	--+	--+	---	---	---
<i>Rotatoria neptunia</i>	---	---	---	---	---	---	---	---	---	---	---	---
<i>Brachionus quadridentatus</i>	---	---	---	---	---	---	---	---	---	---	---	---
<i>Keratella cochlearis</i>	+++	--+	+-	---	+++	+++	++++	+++	+++	++++	++++	+++
<i>Keratella quadrata</i>	---	---	---	---	---	---	+-	---	---	---	---	---
<i>Notholca squamula</i>	---	--+	--+	+-	+-	+-	---	---	---	---	---	---
<i>Notholca acuminata</i>	+-	---	---	---	+-	---	---	---	---	---	---	---
<i>Kellicottia longispina</i>	---	---	---	---	---	---	---	---	+-	+-	---	---
<i>Trichotria tetractis</i>	---	---	---	---	---	+-	---	---	---	---	---	---
<i>Lecane luna</i>	+++	+-	---	---	---	---	+-	---	---	---	---	---
<i>Cephalodella gibba</i>	---	---	---	---	---	---	---	---	+-	---	---	---
<i>Synchaeta pectinata</i>	---	---	---	---	+++	+++	+-	---	---	--+	---	---
<i>Synchaeta oblonga</i>	---	---	---	---	+++	+-	---	---	---	---	---	---
<i>Polyarthra dolichoptera</i>	+-	+-	+-	++++	++++	+++	+++	++++	+-	--+	---	---
<i>Asplanchna priodonta</i>	---	---	---	+-	+-	---	---	---	---	---	---	---
<b>Cladocera</b>												
<i>Bosmina longirostris</i>	---	---	---	---	+-	---	---	+-	+-	--+	---	---
<i>Ceriodaphnia reticulata</i>	---	---	---	---	+-	+++	+-	+-	---	---	---	---
<i>Cydorus sphaericus</i>	---	---	---	---	---	---	+-	+-	+-	+++	---	---
<i>Leptodora kindtii</i>	---	---	---	+-	---	---	---	---	---	---	---	---
<b>Copepoda</b>												
<i>Acanthocyclops vernalis</i>	---	--+	---	---	+-	---	---	---	---	---	---	---
<i>Cyclops vicinus</i>	+-	--+	---	---	+++	+-	+-	+-	---	---	--+	+-

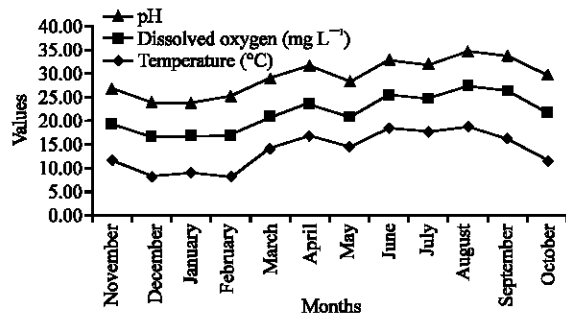


Fig. 1: Monthly values of temperature, dissolved oxygen and pH in Pulumur stream

There was a marked decrease in total zooplankton species richness and individual number in winter and a sharp increase in spring and summer months. The most taxa were observed in spring but less taxa were observed in winter. The most number of species recorded in March (14 species), April (11 species) and May (10 species) and which the less were in September and October (2 species).

Species richness of rotifera was found quite compared to cladocera and copepoda in Turkish inland high when waters (Bekleyen, 2003; Altindag and Yigit, 2004; Yigit and Altindag, 2005; Bekleyen, 2003). The highest species richness was found in rotifera with 14 species in the present study as in other studies in Turkey. According to 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 Altindag, 2007; Kaya *et al.*, 2007). Only three species of Cladocera were observed in the stream. Among them *Bosmina longirostris* and *Chydorus sphaericus* are cosmopolitan species (Buyurgan *et al.*, 2010).

Pulumur stream joins to Munzur river and similar zooplankton species compositions were recorded in Munzur river as *P. roseola*, *K. cochlearis*, *K. quadrata*, *N. squamula*, *K. longispina*, *S. pectinata*, *P. dolichoptera*, *B. longirostris*, *C. reticulata* and *C. vicinus*.

**CONCLUSION**

It is known that there is a positive correlation between temperature and species richness of zooplankton in aquatic environments (Matsubara, 1993; Castro *et al.*, 2005; Hessen *et al.*, 2007). In the present study, species richness of zooplankton is positively affected by increasing temperature so the study supports the hypothesis that species richness of zooplankton is positively affected by increasing temperature.

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