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Zooplankton of Munzur River (Tunceli, Turkey)

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Abstract: The zooplankton fauna of Munzur river was studied between June 2009 to May 2010. A total of 11 taxa were recorded. Out of these 8 species belonging to rotifera 2 to Cladocera 1 to Copepoda were recorded. The most species of zooplankton were found in June and July (11 species) while the minimum species were found in January (1 specie). Most of the zooplankton species were belonged to Rotifera. Also, it was found that the most common family in the study area was belonged to Brachionidae (4 species). All zooplankton species identified are considered as new record for Munzur river.

Key words: Zooplankton rotifera, copepoda, cladocera, Munzur river, water quality, pollution level

INRODUCTION

Cladocerans, copepods and rotifers are the main groups of zooplankton. These groups are characteristic indicatos of water quality and pollution levels and they are an important source of food chain. In Turkish inland waters in lenthic habitats, these groups were partly reported in numerous publications by Saler and Sen (2002, 2010), Saler (2004, 2009), Tellioglu and Akman (2007), Bekleyen (2003), Yigit (2006), Kaya and Altindag (2007) and Bozkurt and Sagat (2008)

A few studies were conducted in rivers and stream as Goksu *et al*. (1997), Bozkurt *et al*. (2002) and Akbulut and Yildiz (2005). Any zooplanktonic research has been conducted in Munzur river. The aim of this study was to determine the zooplankton fauna of Munzur river and hence contribute to knowledge of zooplankton fauna of East Anatolia.

MATERIALS AND METHODS

Munzur river rises from the Munzur mountain located in the north of Ovacik. It combines with Pülümür stream in the city centre of Tunceli and then pour into Keban Dam Lake. The main part of river is flows from Tunceli province. The river is very rich in terms of red-spotted trout (*Salmo trutta magrostigma*). Munzur valley is very beautiful because of natural plants and step slopes, waterfalls, canyons and interesting rock formations. The valley is taken into protection as Munzur natural park. Zooplankton was sampled monthly at 4 different stations between June 2009-May 2010 (Table 1).

Table 1: Collection of zooplankton at different stations

Station	Location
I	39°09'40.84"N,39°28'48.28"E
II	39°04'22.36"N,39°32'21.61"E
III	39°06'15.48"N,39°42'42.46"E
IV	39°06'07.66"N,39°33'07.02"E

Samples were collected with 55 μ ore sized Hydro-Bios plankton net by horizontal hauls and the specimens were preserved. About 4% formaldehyde solution. Zooplanktonic species were identified according to Edmondson (1959), Kolisko (1974), Koste (1978a, b), Telesh (1986), Dumont and de Ridder (1987) and Scourfield and Harding (1966). Temperature and dissolved oxygen were recorded *in situ* by using Oxi 315i/SET oxygen meter and pH value with Lamotte (pH 5-WC) pH meter.

RESULTS AND DISCUSSION

Zooplankton species living in Munzur river are as follows:

Phylum: Rotifera
Classis: Monogononta
Ordo: Ploimia
Familia: Brachionidae
Keratella cochlearis (Gosse, 1851)
Keratella quadrata (O.F.Müller, 1786)
Notholca squamula (O.F.Müller, 1786)
Notholca acuminata (Ehrenberg, 1832)
Familia: Colurellidae
Lepadella ovalis (O.F.Müller, 1786)
Familia: Synchaetidae
Polyarthra vulgaris Carlin, 1943
Synchaeta pectinata Ehrenberg, 1832
Ordo Bdelloidae
Philodina roseola (Ehrenberg,1830)
Phylum: Arthropoda
Subphylum: Crustacea
Classis: Branchiopoda
Ordo: Cladocera
Familia: Daphniidae
Ceriodaphnia reticulata (Jurine, 1820)

Table 2: Monthly distribution of *zooplankton* fauna in the stations of Munzur river

	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Marc	Apr.	May
	(weeks)											
Species	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
K. cochlearis	++ - -	++ - -	++++	- - - +	- - ++	- - - +	- - - +	- - - -	- - - +	- - - +	- - ++	++ - +
K.quadrata	- - - +	- - -+	- -+ -	- -+ -	- - - -	- - - -	- - - -	- - - -	- - - -	+- - +	+- ++	++ - -
N. squamula	++ -+	- -++	- - - -	- - ++	- - - -	- - - -	- - + -	- - + -	- - ++	- - + -	- - -+	- - - -
N. acuminata	- -+ -	- -++	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- +- -	- - - -
L. ovalis	- - + -	- - - +	- - - -	- - - -	- - - +	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
S. pectinata	- - + -	- - - +	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
P. dolichoptera	+ -++	+ -+ -	- - - -	+ - +-	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - ++	- - - +
P. roseola	- -+ -	- - + -	- -+ -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -
C. reticulata	- - - +	- -+ -	- - ++	- - + -	- - - +	- - - +	- - - -	- - - -	- - - -	- - - -	- - ++	- - ++
B. longirostris	- - - +	- - ++	- - -+	- - ++	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	- - + -
C. vicinus	- ++-	- +- -	- - - -	- - - -	- - - -	- - -+	- - -+	- - - -	- - ++	- - - -	+- ++	+ + -+

Table 3: The monthly values of temperature, dissolved oxygen and pH recorded in Munzur river

	Months											
Parameters	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	March	Apr.	May
Temperatute (C°)	10.5	13.8	15.2	16.3	17.2	14.3	15.2	11.3	9.2	8.8	9.6	10.2
Dissolved oxygen (mg L^{-1})	7.3	7.5	7.3	7.8	6.9	7.0	8.2	7.9	9.1	8.6	10.5	6.9
pH	7.4	7.4	7.2	7.1	6.3	7.6	7.6	7.3	7.0	6.9	7.2	7.4

Familia: Bosminidae
Bosmina longirostris (O.F. Muller, 1785)
Classis: Maxillopoda
Subclasis Copepoda
Ordo: Cyclopoida
Familia: Cyclopoidae
Cyclops vicinus Uljanin, 1875

The zooplankton of Munzur river consists mainly of cladocera, copepoda and rorifers groups. A total of 11 species composed of 2 cladocerans, 1 copepods and 8 rotifer species were identified. Monthly distribution of zooplankton fauna in the stations were shown in Table 2. All of these species are recorded for the first time in Munzur river.

Temperature, dissolved oxygen and pH values were recorded in Munzur river and shown in Table 3. In terms of species composition, rotifers have high species number in the river. The most numerous species were representatives (4 species) of the family Brachionidae.Among the species identified *Keratelle cochlearis* and *Notholca squamula* were recorded virtually throughout the sampling period. In contrast, *Lepadella ovalis* and *Synchaeta pectinata* were rarely found in the river. In addition, *C. reticulata* was the most abundant Cladocean species and *C. vicinus* was the single representative of Copepoda. The zooplankton distribution was similar at first three stations. But the 4th station has got lower flow speed. Thus, in this region of river zooplankton diversity and the number of the species and were raised.

CONCLUSION

Ecological features of recorded species were showed that most of the identified species are cosmopolitan and littoral inhabiting. Additionally *Bosmina longirostris*, *Cyclops vicinus*, *Keratella cochlaeraris*, *Polyarthra dolichoptera* are well known indicators of eutrophy. These species were recorded especially in the last station. This station is located in the most crowded part of the city. Also Munzur river includes distinctive species of oligotrophic and mesotrophic systems. The predominant representatives of oligotrophic aquatic systems in temperate climatic regions *S. pectinata*, *P. dolichoptera*, *K. cochlearis* has been observed in the river (Kolisko, 1974). Rotifera showed higher diversity compared to other groups, reaching also high densities throughout the study period.

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