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Cladocera and Copepoda (Crustacea) Fauna of Balya District (Balıkesir/Turkey)

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Abstract

In this study, a total of 35 stations including troughs, ponds and streams were sampled between November 2017 and July 2018 in order to determine the Cladocera and Copepoda (Crustacea) fauna of Balya. As a result, a total of 37 species were determined, 21 from Cladocera and 16 from Copepoda. Based on the previous studies, it has been determined that 34 species are recorded for the first time from study area besides 13 species are also determined as new records for Balıkesir fauna.

Keywords: Cladocera; Copepoda; Balya; Balıkesir; Fauna.

Balya İlçesinin (Balıkesir/Türkiye) Cladocera ve Copepoda (Crustacea) Faunası

Öz

Bu çalışmada, Balya'nın Cladocera ve Copepoda (Crustacea) faunasını belirlemek için yalak, gölet ve akarsuların içinde olduğu toplam 35 istasyon Kasım 2017 ile Temmuz 2018 tarihleri arasında örneklendi. Sonuç olarak 21'i Cladocera'dan, 16'sı Copepoda'dan olmak üzere

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toplam 37 tür belirlendi. Önceki çalışmalara incelendiğinde 34 türün çalışma alanından ilk kez kaydedildiği, üstelik 13 türün de Balıkesir faunası için yeni kayıt olduğu tespit edildi.

Anahtar Kelimeler: Cladocera; Copepoda; Balya; Balıkesir; Fauna.

1. Introduction

Zooplankton occupies a central position in the pelagic food web, transferring carbon and energy from primary producers to higher trophic levels, and potentially suppressing the abundance of phytoplankton. Cladocerans and copepods are small crustaceans and also the most important members of freshwater zooplankton. They are colonized in any kind of freshwater aquatic body (troughs, ponds, lakes, dams, rivers, etc.) and some other wet habitats (leaf litter, sphagnum mat, caves, tree holes, etc.) [1-3].

The diversity of global freshwater cladocerans and copepods is around 620 and 2814 species respectively [4, 5]. However, the richness of actual species is estimated to be 2-4 times higher [6-8]. Compared to other zoogeographical regions, the Cladocera and Copepoda fauna of the Palearctic is quite rich; 245 cladoceran and 1204 copepod species which is more than twice the number recorded for other regions have been recorded [4, 8, 9]. Biodiversity of the Copepoda and Cladocera fauna of Turkey is over than 240 [9].

Balya district is located in the northwest of Balıkesir. In terms of surface area, it is ranked as 5th with 952 km² among the 20 districts of the province. 70% of the surface of Balya is mountainous, the rest is rugged terrain. The highest point is Akçal Hill (642 m.) located in the east. Animal husbandry is the main source of income due to the rough geography of Balya; therefore, many troughs were built for the livestock. Although suitable land is limited, agricultural activities are also carried out in the district; dams and ponds were built to provide the water needed in irrigation [10].

Although being rich in freshwater resources, Cladocera and Copepoda fauna of Balya have not been researched much so far. The only record in the literature was 3 copepod species which were given from Ilıca pond by Sönmez et al. [11]. So, 35 freshwater resources were sampled in this study in order to reveal Cladocera and Copepoda fauna of Balya.

2. Materials and Methods

The samples were collected from 35 stations (Fig. 1.) for 4 times between November 2017 and July 2018 with a help of 60 µm mesh sized plankton net and/or hand net. The localities of the stations are given in Table 1. Geographical data (altitude and

coordinates) were obtained by using a Magellan eXplorist 610 GPS device. Collected samples were immediately preserved with 70% ethanol. Cladocerans and copepods were extracted from detritus using a Pasteur pipette under an OLYMPUS SZX-16 stereomicroscope. Extracted specimens were stored in 70% ethanol. Specimens were prepared by using the method described by Karaytuğ and Sak [12] and were identified under an OLYMPUS BX-50 microscope equipped with a differential interference contrast attachment. Specimens were identified according to Błędzki and Rybak [2], Rogers and Thorp [3], Einsle [13], Ueda and Reid [14], Wells [15], and relevant other literature.

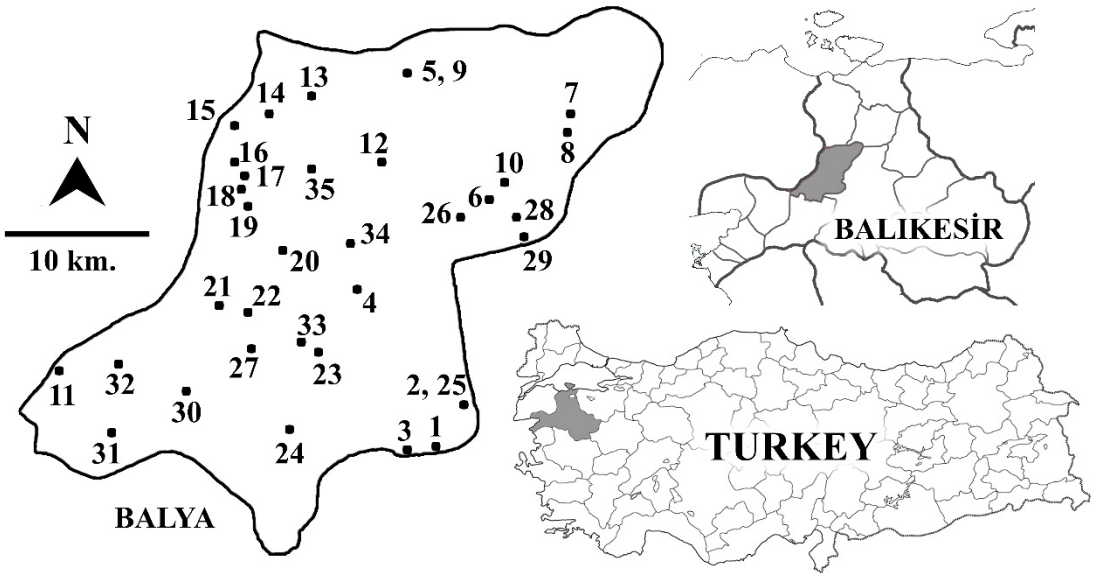

Figure 1: Sampling stations

Table 1: The localities of the stations

Station number	Locality	Type	Coordinate		Altitude (m.)
1	Hacı Hüseyin	Pond	39.67911˚ N	27.66990˚ E	235
2	Ali Demirci I	Pond	39.70834˚ N	27.69579˚ E	269
3	Koca Avşar	Pond	39.67231˚ N	27.64349˚ E	204
4	Kadıköy	Stream	39.77906˚ N	27.60736˚ E	140
5	Koyuneri I	Stream	39,91401˚ N	27.64855˚ E	110
6	Kayalar I	Trough	39.83604˚ N	27.71619˚ E	171
7	Ilıca I	Pond	39.88944˚ N	27.78119˚ E	145
8	Ilıca II	Trough	39.87789˚ N	27.77909˚ E	118
9	Koyuneri II	Trough	39.91472˚ N	27.64840˚ E	121

Station number	Locality	Type	Coordinate		Altitude (m.)
10	Between Ilıca and Kayalar	Stream	39.84483˚ N	27.72702˚ E	146
11	Farsak	Pond	39.73061˚ N	27.36464˚ E	530
12	Ören	Trough	39.85882˚ N	27.62700˚ E	270
13	Değirmendere	Trough	39.90061˚ N	27.57063˚ E	177
14	Mancınık	Trough	39.88962˚ N	27.53625˚ E	189
15	Dereköy I	Trough	39.88034˚ N	27.50861˚ E	206
16	Dereköy II	Trough	39.85821˚ N	27.50773˚ E	267
17	Kara Mustafa I	Trough	39.84784˚ N	27.51548˚ E	352
18	Kara Mustafa II	Trough	39.84295˚ N	27.51332˚ E	344
19	Kara Mustafa III	Trough	39.83192˚ N	27.51980˚ E	432
20	Çalova	Trough	39.80316˚ N	27.54534˚ E	313
21	Doğanlar	Trough	39.76819˚ N	27.49594˚ E	432
22	Doğanlar-Balya Road	Trough	39.76535˚ N	27.51775˚ E	316
23	Balya	Trough	39.74380˚ N	27.57519˚ E	282
24	Göktepe	Trough	39.69258˚ N	27.55242˚ E	391
25	Ali Demirci II	Irrigation canal	39.70834˚ N	27.69579˚ E	269
26	Kayalar II	Pond	39.82528˚ N	27.69250˚ E	200
27	Müstecap I	Trough	39.74285˚ N	27.52187˚ E	251
28	Karlık	Trough	39.82357˚ N	27.73755˚ E	214
29	Söbücealan	Trough	39.81339˚ N	27.74378˚ E	245
30	Çiğdem	Trough	39.71608˚ N	27.46836˚ E	350
31	Çamavşar-Çamucu	Trough	39.69064˚ N	27.40945˚ E	487
32	Çarmık-Yaylacık	Trough	39.73197˚ N	27.41420˚ E	466
33	Müstecap II	Trough	39.74618˚ N	27.56528˚ E	303
34	Semiz-Çukurcak	Trough	39.80881˚ N	27.60152˚ E	366
35	Göloba	Trough	39.85377˚ N	27.57118˚ E	498

3. Results

A total of 37 species were determined, composed of 21 cladocerans and 16 copepods. Identified species and its distribution to the stations and samplings are given in Table 2.

Table 2: Identified species and its distribution to the stations and samplings

	Samplings			
	I November	II February	III May	IV July
	Stations			
Cladocera				
Alona quadrangularis (O.F.Müller, 1776)	4	4		
Bosmina longirostris (O.F.Müller, 1776)	1, 2, 7	2, 3, 4, 5, 10	2, 4, 5, 7, 26	2, 3, 7
Ceriodaphnia pulchella Sars, 1862			5	
Ceriodaphnia reticulata (Jurine, 1820)			11	11

	Samplings			
	I November	II February	III May	IV July
	Stations			
Chydorus sphaericus (O.F.Müller, 1776)		4	4, 7, 10, 15, 17, 18, 19, 22, 24, 25, 26, 27, 30	33
Coronatella rectangula (Sars, 1862)		4	2, 4	
Daphnia cucullata Sars, 1862	2	2, 3, 10	2, 5, 7, 29	2, 5, 6, 7, 32
Daphnia longispina (O.F.Müller, 1776)	2	2, 3, 10	4, 7	
Daphnia parvula Fordyce, 1901	7	2, 3, 7, 10	2, 7	
Diaphanosoma lacustris Kořinek, 1981			5	2, 5
Disparalona rostrata (Koch, 1841)		4		4, 7
Ilyocryptus agilis Kurz, 1878				4
Ilyocryptus sordidus (Liévin, 1848)	4			
Leydigia leydigi (Schödler, 1863)			10	
Leptodora kindtii (Focke, 1844)				5
Macrothrix hirsuticornis Norman & Brady, 1867			21, 31	
Macrothrix laticornis (Jurine, 1820)			5	
Moina brachiata (Jurine, 1820)			11	2
Moina micrura Kurz, 1875			5, 29	1, 3, 7
Pleuroxus aduncus (Jurine, 1820)			9, 26, 28	
Simocephalus vetulus (O.F.Müller, 1776)			9, 25, 26	
Copepoda				
Achantocyclops robustus (Sars, 1862)			1, 3	
Achantocyclops vernalis (Fischer, 1853)			12, 15	
Bryocamptus pygmaeus (Sars, 1863)			18	
Canthocamptus staphylinus (Jurine, 1820)			10, 20	
Cyclops ankyrae Mann, 1940			11	
Cyclops vicinus Uljanin, 1875	1, 2, 3, 4, 7	1, 2, 3, 4, 5, 7, 10	1, 2, 3, 7	
Diacyclops bisetosus (Rehberg, 1880)			21	
Eucyclops serrulatus (Fischer, 1851)	2, 5, 9	4	3, 9, 10, 14, 22, 24, 25, 26, 27, 29, 30, 31	11, 33, 34, 35
Macrocyclops albidus (Jurine, 1820)			12, 25, 27	
Megacyclops latipes (Lowndes, 1927)			20, 21	
Microcyclops rubellus (Lilljeborg, 1901)			4	
Nitokra hibernica (Brady, 1880)			2	2
Paracyclops chiltoni (Thomson, 1882)		1	14, 24	

	Samplings			
	I November	II February	III May	IV July
	Stations			
Paracyclops fimbriatus (Fischer, 1853)			22	6
Thermocyclops oithoinides (Sars, 1863)	7		2, 4, 5, 7,	1, 2, 3, 4, 5, 6, 7, 11, 32
Tropocylops prasinus (Fischer, 1860)	9		10, 22, 24, 26, 27, 28, 29, 30	6, 11, 33, 34

4. Discussion

Analysis of the literature was revealed that the Copepoda fauna of Balya has not been examined sufficiently. The only record in the literature was 3 species (*A. robustus*, *E. serrulatus,* and *T. prasinus*) which were given from Ilıca pond by Sönmez et al. [11]. No record was found in the literature about Cladocera fauna of Balya. So, all taxa identified from the district except 3 copepod species reported previously are new records. In Cladocera, *C. sphaericus* was the most common species followed by *B. longirostris* and *D. cucullata.* In Copepoda, *E. serrulatus* was the most common species followed by *T. prasinus*. It is determined that 13 species are specific to the stations where they are identified (Table 2.).

Turkey is divided into 25 river basins that correspond with its hydrological features by the General Directorate of State Hydraulic Works (GDSH -DSI in Turkish-) [16, 17]. Balıkesir is in the coverage of 3 basins; Marmara, North Aegean and Susurluk. Therefore, many water bodies fed by different streams have spread throughout the province, but only few of them have been studied. A total of 68 species, including 37 cladocerans and 31 copepods were recorded from various water resources (İkizcetepeler Dam Lake, Çaygören Dam Lake, Manyas Dam Lake, Manyas Lake, Gönen Stream) of Balıkesir [11, 18-33]. It is noteworthy that Lake Manyas was studied [18-25] more intensively than other places, 19 species were reported from the lake. A total of 13 species, 6 of the Cladocera (*Ceriodaphnia pulchella*, *Daphnia parvula*, *Diaphanosoma lacustris*, *Ilyocryptus agilis*, *Ilyocryptus sordidus*, and *Macrothrix hirsuticornis*) and 7 of the Copepoda (*Canthocamptus staphylinus*, *Cyclops ankyrae*, *Diacyclops bisetosus*, *Megacyclops latipes*, *Microcyclops rubellus*, *Paracyclops fimbriatus,* and *Thermocyclops*

oithoinides) identified in our study have not been recorded previously from the province; therefore, they are new records for Balıkesir fauna.

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