

RESEARCH ARTICLE

Observations on zooplankton in some lagoons in Turkey

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Abstract

In this study, zooplankton samples collected from some lagoons in 1995 and 1996 with the scope of management and development strategies and improvement project of lagoons in Turkey coasts were used. In total, samples of 35 lagoons were studied, including 5 of Black Sea lagoons, 8 of Sea of Marmara lagoons, 15 of Aegean Sea lagoons, and 7 of Mediterranean Sea lagoons. As a result, 125 taxa were found, including 64 Rotifera, 24 Cladocera, and 32 Copepoda and 5 Ostracoda.

Key words: Rotifera, Cladocera, Copepoda, Ostracoda, lagoons, Turkey

Introduction

A lagoon is a body of shallow sea water or brackish water separated from the sea by some form of barrier. The EU's habitat directive defines lagoons as "expanses of shallow coastal salt water, of varying salinity or water volume, wholly or partially separated from the sea by sand banks or shingle, or, less frequently, by rocks. Salinity may vary from brackish water to hyper salinity depending on rainfall, evaporation and through the addition of fresh seawater from storms, temporary flooding by the sea in winter or tidal exchange". Lagoons are also ecotones between freshwater, marine and terrestrial biotopes, which abiotic structure is therefore forced by coastal geomorphological processes, hydrological processes, natural vegetation and land use in the watershed.

The lagoons cover more than 60,000 hectares in the coastal regions of Turkey. Approximately 50% and 35% of lagoonal areas are located in the Mediterranean and Aegean coasts of Turkey, respectively (Yerli, 1999).

First studies on the zooplankton of Turkey's lagoons (Miliç, Bafa, Güllük and Köyceğiz Lakes) were made by Demirhindi (1972). Lake Balık located on

Kızılırmak Delta, Lake Uzungöl, Lake Çernek and Lake Liman were the other lagoon lakes, where the zooplankton studies concentrated (Gündüz 1989, 1990, 1991a, 1991b; Emir 1990; Gündüz *et al.* 2005; Demirkalp *et al.* 2004, 2010; Bekleyen and Taş 2008). In recent years, Ustaoglu and Balık (1990) studied on the zooplankton of Lake Gebekirse, Kazancı *et al.* (1992) studied on the limnology of Lake Köyceğiz, Özçalkap and Temel (2011) studied on the zooplankton of Lake Küçükçekmece, respectively.

With this study, conducted in 35 lagoons of Turkey, we aim to provide the basis for further studies on the zooplankton.

Materials and Methods

The zooplankton samples of the project about the management and development strategies on Turkey's Lagoons, collected in 1995 and 1996, were evaluated. In total, samples of 35 lagoons were studied, including 5 of Black Sea lagoons, 8 of Sea of Marmara lagoons, 15 of Aegean Sea lagoons, and 7 of Mediterranean Sea lagoons (Figure 1). A summary of some key features of sampled lagoons is presented in Table 1.

Major environmental variables such as water temperature, dissolved oxygen, salinity, pH, were measured *in situ*. pH was measured with Oxyguard Model pH meter. Dissolved oxygen was measured with Oxyguard Mod. MKIII oxygen meter and salinity was measured with Atago S/Mill cat.2441 refractometer (Table 2).

Collection of zooplankton materials were made by filtering of 50 l water with a plankton collector of 55 µm mesh. Samples were fixed and stored in 4% formalin solution. Several taxonomic books were used for species classification, such as Ruttner-Kolisko (1974), Stemberger (1979), Koste (1978), Segers (1995), Nogrady and Segers (2002) Flössner (1972), Smirnov (1974, 1992, 1996), Negrea (1983), Korovchinsky (1992), Benzie (2005), Kotov and Stifter (2006), Rylov (1963), Dussart (1967, 1969), Kiefer (1978), Einsle (1996), Henderson (1990) and Meisch (2000).

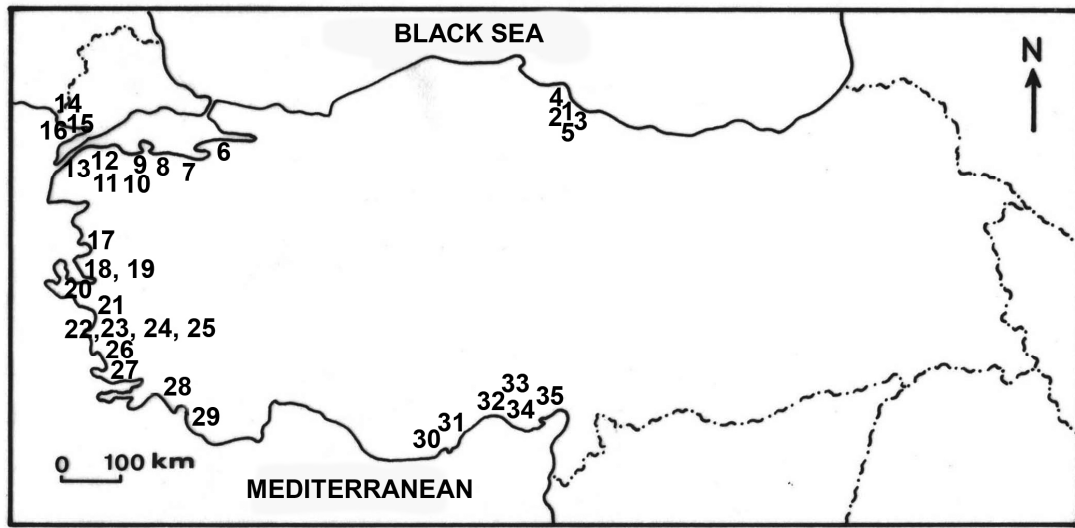


Figure 1. Geographical locations of Turkish lagoons.

Table 1. The general features of lagoons studied (BS: Black Sea, SM: Sea of Marmara, AS: Aegean Sea, MS: Mediterranean Sea).

No	Locality	County	Sea	Coordinates	Area (ha)	Depth (m)
1	Lake Balık	Bafra-Samsun	BS	41°36'05"N 36°05'10"E	1300	1.7
2	Lake Tatlıgöl	Bafra-Samsun	BS	41°34'10"N 36°03'49"E	52	1.0
3	Lake Uzungöl	Bafra-Samsun	BS	41°35'33"N 36°06'33"E	293	1.0
4	Lake Çernek	Bafra-Samsun	BS	41°37'46"N 36°04'08"E	589	1.1
5	Lake Gıcı	Bafra-Samsun	BS	41°35'07"N 36°04'05"E	125	1.0
6	Lake Hersek	Karamürsel-Yalova	SM	40°43'12"N 29°30'25"E	150	5.0
7	Lake Arapçiftliği	Karacabey-Bursa	SM	40°24'35"N 28°30'42"E	550	4.0
8	Lake Poyraz (Dalyan)	Karacabey-Bursa	SM	40°23'15"N 28°28'23"E	170	*
9	Lake Yarıntı	Misakça-Balıkesir	SM	*	19	5.0
10	Lake Tahir	Misakça-Balıkesir	SM	40°31'66"N 27°58'33"E	5	*
11	Tuzlu Azmak	Misakça-Balıkesir	SM	*	6	*
12	Lake Hoyrat	Karabiga-Çanakkale	SM	40°19'04"N 27°26'22"E	10	1.5
13	Lake Çardak Buruniçi	Lapseki-Çanakkale	SM	40°23'12"N 26°42'16"E	180	3.5
14	Lake Taşaltı	Enez-Edirne	AS	40°42'47"N 26°05'10"E	30	0.4

Table 1 Continued.

No	Locality	County	Sea	Coordinates	Area (ha)	Depth (m)
15	Lake Dalyan	Enez-Edirne	AS	40°42'50"N 26°03'02"E	250	0.7
16	Lake Bücürmene	Enez-Edirne	AS	40°42'27"N 26°03'54"E	50	1.0
17	Lake Dalyan	Çandarlı-İzmir	AS	*	50	*
18	Homa Lagoon	İzmir	AS	38°33'04"N 26°51'59"E	900	0.5
19	Raufpaşa Lagoon	İzmir	AS	*	850	1.5
20	Çakalburnu Lagoon	İzmir	AS	*	150	1.0
21	Lake Gebekirse	Selçuk-İzmir	AS	37°59'11"N 27°18'14"E	60	5.0
22	Karine Lagoon	Söke-Aydın	AS	37°35'37"N 27°10'40"E	2460	1.0
23	Karaca Lagoon	Yenihisar-Aydın	AS	37°31'55"N 27°11'27"E	538	1.0
24	Kabahayıt Lagoon	Yenihisar-Aydın	AS	37°28'35"N 27°12'59"E	305	*
25	Lake Bafa	Yenihisar-Aydın	AS	*	6500	*
26	Güllük Lagoon	Milas-Muğla	AS	*	25	5.0
27	Tuzla Lagoon	Milas-Muğla	AS	*	320	2.0
28	Lake Köyceğiz	Köyceğiz-Muğla	AS	36°54'58"N 28°33'34"E	5500	*
29	Lake Gelemiş	Kaş-Antalya	MS	36°15'54"N 29°18'53"E	7	0.5
30	Lake Akgöl	Silifke-İçel	MS	36°17'42"N 33°59'52"E	820	0.5
31	Paradeniz Lagoon	Silifke-İçel	MS	36°18'10"N 34°00'55"E	590	1.2
32	Lake Tuzla	Tuzla-Adana	MS	36°42'12"N 35°02'41"E	800	*
33	Akyatan Lagoon	Karataş-Adana	MS	36°35'02"N 35°19'19"E	5000	0.4
34	Ağyatan Lagoon	Karataş-Adana	MS	36°34'53"N 35°32'32"E	1100	*
35	Çamlık Lagoon	Yumurtalık-Adana	MS	36°42'38"N 35°36'11"E	1300	*

* *Not measured.*

Table 2. Some physico-chemical properties of studied lagoons.

No	Locality	Depth (m)	Temp. (°C)	Salinity (‰)	D. Oxygen (mg/L)	pH
1	Lake Balık	0.9-1.5	12.9-26.9	0-6	9.5-13.2	8.28-9.15
2	Lake Tatlıgöl	0.8-1.0	13.4-27.9	0-4	10.0-17.3	8.20-9.60
3	Lake Uzungöl	0.6-1.5	12.5-26.8	0-2	9.3-12.8	8.22-9.20
4	Lake Çernek	0.8-1.4	15.7-30.3	0-10	7.4-10.2	8.38-9.56
5	Lake Gıcı	1.0-1.3	12.8-26.8	4	8.9-17.4	8.11-9.96
6	Lake Hersek	0.5	*	31	*	*
7	Lake Arapçiftliği	0.5	3.0	10	*	*
8	Lake Poyraz (Dalyan)	*	3.0	11-13	*	*
9	Lake Yarıntı	1.0	9.3	22	*	*
10	Lake Tahir	1.0	10.5	28	*	*
11	Tuzlu Azmak	1.2	7.7	28	*	*
12	Lake Hoyrat	1.0-1.2	*	15	*	*
13	Lake Çardak Buruniçi	2.0-3.0	*	25	*	*
14	Lake Taşaltı	0.5-0.8	7.1-22.4	1-22	7.5-11.1	7.89-8.39
15	Lake Dalyan	0.3-1.0	7.6-22.6	1-33	3.8-12.7	7.76-8.38
16	Lake Bücürmene	0.9-1.0	8.1-33.8	32-35	8.8-12.5	7.94-8.29
17	Lake Dalyan	1.0	*	12	*	*
18	Homa Lagoon	1.0	*	43-54	*	*
19	Raufpaşa Lagoon	1.0	*	39	*	*
20	Çakalburnu Lagoon	0.5	*	38	*	*
21	Lake Gebekirse	2.0-3.0	*	4-5	*	*
22	Karine Lagoon	0.5-1.0	*	21-45	*	*
23	Karaca Lagoon	1.0	*	40-41	*	*
24	Kabahayıt Lagoon	1.0	*	40-41	*	*
25	Lake Bafa	15.0	*	2-15	*	*
26	Güllük Lagoon	1.0	*	5-9	*	*
27	Tuzla Lagoon	0.2-1.0	*	16-17	*	*
28	Lake Köyceğiz	*	*	3-5	*	*
29	Lake Gelemiş	1.0	*	11	*	*
30	Lake Akgöl	0.5-1.2	12.3-33.3	1-4	8.9-15.1	8.63-10.92

Table 2 Continued.

No	Locality	Depth (m)	Temp. (°C)	Salinity (‰)	D. Oxygen (mg/L)	pH
31	Paradeniz Lagoon	0.5-1.3	12.3-31.0	12-39	5.4-9.6	7.98-8.31
32	Lake Tuzla	1.0-2.0	*	3-22		
33	Akyatan Lagoon	0.3-1.8	11.0-31.2	0-33	7.4-15.3	7.92-8.97
34	Ağyatan Lagoon	0.8-1.0	*	15-19	*	*
35	Çamlık Lagoon	0.5	*	5-24	*	*

* Not measured.

Results

Throughout the study, total of 64 rotifera, 24 cladocera, 32 copepoda, and 5 ostracoda species were recorded. Table 3 shows the list of identified species found in studied lagoons. From the rotiferan species distribution, maximum numbers of species were identified in Lake Akgöl (30 species), Lake Çernek (26 species), Lake Balık (23 species), Lake Tatlıgöl (20 species), Lake Gıcı and Akyatan Lagoon (19 species each). Among the cladoceran composition, maximum numbers of species were recorded in Lake Uzungöl (15 species), Lake Balık (14 species), Lake Çernek (13 species), Lake Tatlıgöl (11 species) and Lake Gıcı (9 species). As for the copepods, maximum numbers of species were recorded in Lake Balık (8 species). After that, 5 species of copepod were recorded in Lake Uzungöl, Lake Gıcı and Akyatan Lagoon, and 4 species were recorded in Lake Tatlıgöl, Lake Çernek, Lake Bücürmene and Karaca Lagoon. The most ostracods rich station was Lake Gıcı (3 species). Considering all zooplankton groups, 47 zooplankton taxa were recorded in Lake Balık, followed by Lake Çernek (44 taxa) and Lake Uzungöl (41 species).

The dominant rotifers recorded in this study were *Keratella cochlearis* and *Keratella quadrata* (20 localities each), *Polyarthra vulgaris* (16 localities), *Brachionus calyciflorus* (14 localities), *Brachionus angularis* and *Notholca salina* (13 localities each), *Brachionus diversicornis*, *Filinia longiseta*, *Filinia terminalis*, and *Keratella tecta* (10 localities each). Among the cladocerans, the most frequently recorded taxa were *Bosmina longirostris* (10 localities), *Chydorus sphaericus* (9 localities), *Daphnia cucullata* and *Daphnia longispina* (7 localities each), *Daphnia galeata*, *Daphnia hyalina* and *Diaphanosoma brachyurum* (6 localities each). *Acartia clausi* (10 localities), *Calanipeda aquaedulcis* (7 localities), *Eurytemora velox* and *Megacyclops viridis* (5 localities each) were the most frequently recorded copepods. Among the ostracods, *Cypria ophthalmica* and *Cyprideis torosa* were dominant species.

Table 3. List of species found in the studied lagoons (BS: Black Sea, SM: Sea of Marmara, AS: Aegean Sea, MS: Mediterranean Sea).

Taxa	BS (1-5)	SM (6-13)	AS (14-28)	MS (29-35)
ROTIFERA				
<i>Ascomorpha ecaudis</i> Petry, 1850		9		
<i>Ascomorpha saltans</i> Bartsch, 1870		10,13	14,15	29
<i>Asplanchna girodi</i> de Guerne, 1888	1,2,4		14,15	
<i>Asplanchna priodonta</i> Gosse, 1850	1,2		14	
<i>Asplanchna sieboldi</i> (Leydig, 1854)	1,3,4			
<i>Asplanchnopus hyalinus</i> Harring, 1913			15	
<i>Brachionus angularis</i> Gosse, 1851	1-5		14-16, 18,20	32
<i>Brachionus bidentatus</i> Anderson, 1889				35
<i>Brachionus calyciflorus</i> Palas, 1766	1-5	7,8	14,15,17, 19,27	32,33
<i>Brachionus diversicornis</i> (Daday, 1883)	1-5		14,16	30,31,33
<i>Brachionus plicatilis</i> Müller, 1786	4		14,15,28	29,30,33, 35
<i>Brachionus quadridentatus</i> Hermann, 1783	2,4,5		14,21	30,32,33
<i>Brachionus rubens</i> Ehrenberg, 1838	5			
<i>Brachionus urceolaris</i> Müller, 1773	1-5		28	33
<i>Cephalodella forficula</i> (Ehrenberg, 1830)				30
<i>Cephalodella gibba</i> (Ehrenberg, 1830)				30,33
<i>Colurella</i> sp.		7		
<i>Conochilus (Conochiloides) coenobasis</i> (Skorikov, 1914)	3			
<i>Conochilus (Conochiloides) dossuaris</i> Hudson, 1885	1			
<i>Eosphora najas</i> Ehrenberg, 1830				30,33
<i>Epiphanes senta</i> (Müller, 1773)		6	17,20	
<i>Euchlanis deflexa</i> (Gosse, 1851)	5		15	
<i>Euchlanis dilatata</i> Ehrenberg, 1832	2-4			
<i>Euchlanis dilatata lucksiana</i> Hauer, 1930				30
<i>Filinia limnetica</i> (Zacharias, 1893)	1			
<i>Filinia longiseta</i> (Ehrenberg, 1834)	1-4		14,15,28	31-33
<i>Filinia terminalis</i> (Plate, 1886)	1-5		14,27,28	30,33

Table 3 Continued.

Taxa	BS (1-5)	SM (6-13)	AS (14-28)	MS (29-35)
<i>Hexarthra fennica</i> (Levander, 1892)	2-4			30,31,33, 35
<i>Hexarthra intermedia</i> (Wiszniewski, 1929)	1,2,5			
<i>Hexarthra mira</i> (Hudson, 1871)	1,5	11		29,32,33
<i>Keratella cochlearis</i> (Gosse, 1851)	1-4	6,8,11, 13	14,15,17, 20,21,23, 25,26	29-31,33
<i>Keratella quadrata</i> (Müller, 1786)	1-5	8	14-18,23, 25-28	29-31,33
<i>Keratella tecta</i> (Gosse, 1851)	1	11	14,20,21, 26,27	30,31,33
<i>Keratella tropica</i> (Apstein, 1907)	1-3	6	18	
<i>Lecane bulla</i> (Gosse, 1886)			15	
<i>Lecane closterocerca</i> (Schmarda, 1859)				30
<i>Lecane hastata</i> (Murray, 1913)	2			
<i>Lecane inermis</i> (Bryce, 1892)			17,25	30,31
<i>Lecane lamellata</i> (Daday, 1893)		7		30,33
<i>Lecane ludwigi</i> (Eckstein, 1893)				30
<i>Lecane luna</i> (Müller, 1776)	1-5			30,31
<i>Lecane papuana</i> (Murray, 1913)	3			
<i>Lecane quadridentata</i> (Ehrenberg, 1830)	3,4			30
<i>Lecane ungulata</i> (Gosse, 1887)	4			30
<i>Lepadella (Heterolepadella) ehrenbergii</i> Petry, 1850				30
<i>Lepadella (Lepadella) ovalis</i> (Müller, 1786)	1			
<i>Mytilina ventralis</i> (Ehrenberg, 1830)	4		14	30
<i>Notholca acuminata</i> (Ehrenberg, 1832)	1,3-5		18	
<i>Notholca salina</i> Focke, 1961		8,12	14,15,17, 26,28	29,30, 32-35
<i>Notholca squamula</i> (Müller, 1786)	5			
<i>Polyarthra dolichoptera</i> Idelson, 1925	4		14	30
<i>Polyarthra vulgaris</i> Carlin, 1943	1-5	7,8,11	14,15,17, 19,21	30,31,33
<i>Pompholyx sulcata</i> Hodson, 1885	1,2,4,5		25	31
<i>Synchaeta pectinata</i> Ehrenberg, 1832	1,3,4		14-16	

Table 3 Continued.

Taxa	BS (1-5)	SM (6-13)	AS (14-28)	MS (29-35)
<i>Synchaeta</i> sp.	2,5	6,8,10, 13	21,24,27, 28	30-35
<i>Testudinella elliptica</i> (Ehrenberg, 1834)		12	15,17	32,34
<i>Testudinella mucronata</i> (Gosse, 1886)	5			
<i>Testudinella patina</i> (Hermann, 1783)	4,5			30,33
<i>Trichocerca lophoessa</i> (Gosse, 1886)				30
<i>Trichocerca rattus</i> (Müller, 1776)		8		
<i>Trichocerca stylata</i> (Gosse, 1851)	4			
<i>Trichotria pocillum</i> (Müller, 1776)			15	30
<i>Trichotria tetractis</i> (Ehrenberg, 1830)				30
<i>Tripleuchlanis plicata</i> (Levander, 1894)	4			30
CLADOCERA				
<i>Alona rectangula</i> Sars, 1862	1,3,4			30,33
<i>Bosmina longirostris</i> (O.F.Müller, 1785)	1-5		14-16	31,33
<i>Ceriodaphnia dubia</i> Richard, 1894	1			
<i>Ceriodaphnia pulchella</i> Sars, 1862				32
<i>Ceriodaphnia quadrangula</i> (O.F.Müller, 1785)	2			
<i>Ceriodaphnia reticulata</i> (Jurine, 1820)	1,3			32
<i>Chydorus sphaericus</i> (O.F.Müller, 1776)	1-5		14,28	30,33
<i>Daphnia</i> (C.) <i>atkinsoni</i> Baird, 1859	1,3,4			
<i>Daphnia</i> (C.) <i>magna</i> (Straus, 1820)	3,4			
<i>Daphnia cucullata</i> Sars, 1862	1-5		16	31
<i>Daphnia galeata</i> Sars, 1864	1-5		15	
<i>Daphnia hyalina</i> Leydig, 1860	1,4	6	15	
<i>Daphnia longispina</i> O.F.Müller, 1875	1-5		14,16	
<i>Daphnia</i> sp.				30,33
<i>Diaphanosoma brachyurum</i> (Liévin, 1848)	1-3,5	6		33
<i>Diaphanosoma mongolianum</i> Ueno, 1938	2			
<i>Ilyocryptus sordidus</i> (Liévin, 1848)	4			
<i>Leydigia leydigi</i> (Schoedler, 1863)	3-5		15	
<i>Macrothrix laticornis</i> (Fischer, 1851)	3			

Table 3 Continued.

Taxa	BS (1-5)	SM (6-13)	AS (14-28)	MS (29-35)
<i>Moina macrocopa</i> (Straus, 1820)	5			
<i>Moina micrura</i> Kurz, 1874	1,2,5			
<i>Pleopis polyphemoides</i> (Leucart, 1859)		13	17,20,25	
<i>Pleuroxus aduncus</i> (Jurine, 1820)	1-4			
<i>Simocephalus vetulus</i> (O.F.Müller, 1776)	1,3,4			
COPEPODA				
<i>Acanthocyclops robustus</i> (G.O.Sars, 1863)	1			
<i>Acartia (Acartiura) clausi</i> Giesbrecht, 1889		8	14-16,18, 19,20	32,33,35
<i>Calanipeda aquaedulcis</i> Kritschagin, 1873	1-5		21	29
<i>Calocalanus contractus</i> Farran, 1926			23	
<i>Clausocalanus</i> sp.			23	
<i>Cletocamptus retrogressus</i> Schmankevitch, 1875				33
<i>Cryptocyclops bicolor</i> (G.O.Sars, 1863)				30
<i>Cyclops strenuus</i> Fischer, 1851	1,2,5			
<i>Cyclops vicinus</i> Uljanin, 1875	1,4			
<i>Diacyclops bicuspidatus odessanus</i> (Schmankevitch, 1875)				32
<i>Diacyclops bisetosus</i> (Rehberg, 1880)		12		
<i>Eucyclops serrulatus</i> (Fischer, 1851)	3			
<i>Eudiaptomus arnoldi</i> (Siewerth, 1928)	1,5			
<i>Eurytemora velox</i> (Lilljeborg, 1853)	1,2,4,5			30
<i>Halicyclops neglectus</i> Kiefer, 1935		7	14	33
<i>Harpacticus littoralis</i> G.O.Sars, 1910			22	
<i>Harpacticus</i> sp.			16,23	
<i>Heterolaophonte stroemii</i> (Baird, 1834)			16	
<i>Laophonte</i> sp.		12		
<i>Limnocletodes behningi</i> Borutzky, 1926	1			
<i>Mecynocera clausii</i> Thompson, 1888			18,23	
<i>Megacyclops viridis</i> (Jurine, 1820)	2-5		14	
<i>Mesochra aestuarii</i> Gurney, 1921	3			

Table 3 Continued.

Taxa	BS (1-5)	SM (6-13)	AS (14-28)	MS (29-35)
<i>Mesochra</i> sp.		6,9,11		33
<i>Mesocyclops leuckarti</i> (Claus, 1857)	1			
<i>Metis ignea</i> Philippi, 1843		9,11		
<i>Nitokra lacustris</i> (Schmankevitch, 1875)		7		30
<i>Oithona nana</i> Giesbrecht, 1892			16,23	
<i>Oithona plumifera</i> Baird, 1843			23	
<i>Onychocamptus mohammed</i> (Blanchard & Richard, 1891)	3			
<i>Paracalanus parvus</i> (Claus, 1863)				35
<i>Tisbe</i> sp.				33,34
OSTRACODA				
<i>Cypria ophthalmica</i> (Jurine, 1820)	1-3,5			
<i>Cyprideis torosa</i> (Jones, 1850)	1,5	12		32
<i>Potamocypris arcuata</i> (Sars, 1903)	5			
<i>Potamocypris steueri</i> Klie, 1935				33
<i>Sarscypridopsis aculeata</i> (Costa, 1847)	3,4			

Discussion and Conclusion

In the first study on the zooplankton of Turkey's lagoons (Miliç, Bafa, Güllük and Köyceğiz Lakes), 8 cladocerans (*Daphnia longispina*, *Daphnia cucullata*, *Ceriodaphnia quadrangula*, *Bosmina longirostris*, *Chydorus sphaericus*, *Alona rectangulara*, *Diaphanosoma brachyurum*, *Pleopis polyphemoides*) and 3 copepods (*Halicyclops neglectus*, *Calanipeda aquaedulcis*, *Diacyclops bicuspidatus*) were reported (Demirhindi 1972). In the other studies focused on the zooplankton of the lagoons located at Kızılırmak Delta, 25 rotifers from Lake Balık (Emir 1990), 7 copepods and 17 cladocerans from Lake Balık and Uzungöl (Gündüz 1991a and b), 8 cladocerans and 2 copepods (Demirkalp *et al.* 2004) and 18 rotifers, 10 cladocerans and 3 copepods (Bekleyen and Taş 2008) from Lake Çernek, 28 rotifers, 5 cladocerans and 2 copepods from Lake Liman (Demirkalp *et al.* 2010) were reported. However, copepod *Mesochra aestuarii* was reported as a new record (Gündüz 1989) and *Ilyocryptus samsuni* sp. nov. (Gündüz 1990) was reported for the first time from Lake Balık.

Ustaoğlu and Balık (1990) reported 11 rotifers, 2 cladocerans and 4 copepods from Lake Gebekirse. 5 rotifers, 1 copepods and 1 cladocerans from Lake

Köyceğiz (Kazancı *et al.* 1992) and 13 rotifers, 3 copepods and 2 cladocerans from Lake Küçükçekmece (Özçalkap and Temel 2011) were reported, previously.

As shown in Table 2, due to excessive freshwater input and lower salinity levels (0-10‰), the highest number of zooplankton was observed in Lake Balık, Lake Tatlıgöl, Lake Uzungöl, Lake Çernek, Lake Gıcı, Lake Taşaltı, Lake Dalyan (Enez), Lake Akgöl (Silifke), and Akyatan Lagoon. In the other lagoons, fresh water organisms have been replaced by brackish water and marine species, since the salinity levels were higher. Among the copepods, *Acartia clausi*, *Calocalanus contractus*, *Clausocalanus* sp., *Harpacticus littoralis*, *Heterolaophonte stroemii*, *Laophonte* sp., *Limnocletodes behningi*, *Mecynocera clausii*, *Metis ignea*, *Paracalanus parvus* and *Tisbe* sp. were marine taxa, *Cletocamptus retrogressus*, *Halicyclops neglectus*, *Oithona nana* and *Oithona plumifera* were brackish water taxa.

Eight (Lake Balık, Lake Tatlıgöl, Lake Uzungöl, Lake Çernek, Lake Gebekirse, Lake Bafa, Güllük Lagoon, Lake Köyceğiz) out of 35 of the localities have been studied previously. All the taxa identified are new records for their localities except the taxa in previous studies.

Türkiye'deki bazı lagünlerin zooplanktonu üzerine gözlemler

Özet

Türkiye kıyılarındaki lagünlerin yönetim ve geliştirme stratejileri ve ıslahı konusunda yapılan proje kapsamında, 1995 ve 1996 yıllarında ülkemizdeki bazı lagünlerden toplanan zooplankton örnekleri değerlendirilmiştir. Karadeniz lagünlerinden 5 (Balık Gölü, Tatlıgöl, Uzungöl, Çernek Gölü, Gıcı Gölü), Marmara Denizi lagünlerinden 8 (Hersek Gölü, Arapçiftliği Gölü, Poyraz (Dalyan) Gölü, Yarıntı Gölü, Tahir Gölü, Tuzluazmak, Hoyrat Gölü, Çardak Buruniçi Gölü), Ege Denizi lagünlerinden 15 (Taşaltı Gölü, Dalyan Gölü (Peso Gölü) (Enez), Bücürmene Gölü, Dalyan Gölü (Çandarlı), Homa Lagünü, Raufpaşa Dalyanı, Çakal Burnu Dalyanı, Gebekirse Gölü, Karine Dalyanı, Karaca Dalyanı, Kabahayıt Dalyanı, Bafa Gölü, Güllük Dalyanı, Tuzla Lagünü (Milas), Köyceğiz Dalyanı) ve Akdeniz lagünlerinden 7 (Gelemiş Gölü, Akgöl, Paradeniz Gölü, Tuzla Gölü (Tuzla), Akyatan Gölü, Ağyatan Gölü, Çamlık Dalyanı) olmak üzere 35 adet lagün çalışılmıştır. Zooplankton örnekleri 55 µm göz açıklığındaki naylon elekten 50 L suyun filtrelenmesiyle toplanmış ve %4 lük formalin solüsyonunda saklanmıştır. Çalışma sonucunda 64 rotifer, 24 kladoser, 32 kopepod ve 5 ostrakot olmak üzere toplam 125 takson saptanmıştır.

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