

Freshwater and Brackish Amphipods (Crustacea: Amphipoda) from Turkish Thrace Region (Including Çanakkale Province)

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Abstract: In order to determine the fresh and brackish water amphipod species of the Turkish Thrace Region, specimens were sampled from 68 localities in İstanbul, Edirne, Tekirdağ, Kırklareli and Çanakkale Provinces. Totally, 16 amphipod taxa were identified: *Gammarus arduus* G. Karaman, 1975, *G. komareki* Schäferna, 1922, *G. pulex pulex* (L., 1758), *G. fossarum* Koch, 1836, *G. balcanicus* Schäferna, 1922, *G. aequicauda* (Martynov, 1931), *G. subtypicus* Stock, 1966, *G. uludagi* Karaman, 1975, *G. gonensis* Özbek, 2016, *G. kesianensis* Özbek & Çamur-Elipek, 2010, *Dikerogammarus istanbulensis* Özbek & Özkan, 2011, *Amathillina cristata* Sars, 1894, *Orchestia cavimana* Heller, 1865, *Synurella ambulans* F. MÜLLER, 1846, *Pontogammarus robustoides* Sars, 1894 and *Niphargus* sp. All the determined species were previously recorded from Turkey. This is the first record of *Gammarus gonensis* in Europe. Information about the sampling localities and a distribution map of the species are presented.

Key words: Amphipoda, *Gammarus*, *Dikerogammarus*, Ponto-Caspian species.

Introduction

Among the various amphipod genera, *Niphargus* and *Gammarus* probably are the two genera which have the highest number of freshwater species (KARAMAN & PINKSTER 1977a). Species belonging to these genera inhabit both hypogean and epigeal habitats of marine and freshwater environments. The members of the genus *Gammarus* mainly inhabit epigeal habitats while those of *Niphargus* are recorded in hypogean habitats. On the other hand, hypogean *Gammarus* and epigeal *Niphargus* species are also known. The other freshwater amphipod genera distributed in Turkey are less represented in number of species than these two huge genera.

Worldwide, about 2,000 species of freshwater amphipods are known, with 70% of them found in the Palaearctic (VÄINÖLÄ et al. 2008). The number of species of *Gammarus* living in freshwater is larger than that of the marine ones. It is represented by

about 130 species worldwide (HOU & LI 2004).

The amphipod fauna of Turkish freshwaters was the object of intensive studies by several scientists. The pioneering study on the subject by VÁVRA (1905) includes the description of *Gammarus argaeus* Vávra, 1905 from the Erciyes Mountain, Kayseri Province. The last two studies on the freshwater amphipod fauna of Turkish freshwater are reported by REWICZ et al. (2016) and by ÖZBEK et al. (2016), who described a new species, *Gammarus gonensis* ÖZBEK 2016, from the Gönen River, Balıkesir Province, NW Anatolia.

In this study, we present data on the distribution of fresh and brackish water amphipod species in the Turkish Thrace Region. Our results contribute to the knowledge on the distribution of amphipod species inhabiting fresh and brackish water habitats in Turkey.

Materials and Methods

In order to determine the amphipod species inhabiting the Turkish Thrace Region, specimens were sampled from İstanbul, Edirne, Tekirdağ, Kırklareli and Çanakkale Provinces (Fig. 1, Table 1). We studied 18 samples from Çanakkale Province, ten samples from Edirne Province, ten samples from İstanbul Province, 22 samples from Kırklareli Province and nine samples from Tekirdağ Province. Amphipod samples were collected from 68 stations in total. The stations covered various habitats types, such as fountains, streams, ponds, lakes, reservoirs and coastal lagoons. Consequently, some of the sampling localities were purely freshwater while some others had brackish character (e.g. Büyük Çekmece Lake).

Amphipod samples were collected with a hand net with 500 µ mesh size. The collected specimens were fixed in formalin solution in the field then sorted and preserved in 80% ethyl alcohol solution in the laboratory. They were dissected and temporary slides were prepared using glycerine alcohol solution. Then they were studied under a stereo-microscope and a light microscope in the laboratory. Amphipod samples were provided by the second

(N.Ö.) and third (B. Ç. E.) authors of this study from their own collections. All materials are deposited in the ESFM (Museum of Faculty of Fisheries, Ege University, İzmir, Turkey).

Results

Totally, 16 amphipod taxa belonging to the families Gammaridae, Pontogammaridae, Niphargidae, Talitridae and Crangonyctidae were identified. Among them, the Gammaridae was the richest family with 12 species.

The list of the identified taxa and their systematic status are as follows:

Family Gammaridae Leach, 1813

Gammarus aequicauda (Martynov, 1931)

Gammarus arduus G. Karaman, 1975

Gammarus balcanicus Schäferna, 1922

Gammarus fossarum Koch, 1836

Gammarus gonensis Özbek, 2016

Gammarus kesianensis Özbek & Çamur-Elipek, 2010

Gammarus komareki Schäferna, 1922

Gammarus pulex pulex (L., 1758)

Gammarus subtypicus Stock, 1966

Gammarus uludagi Karaman, 1975

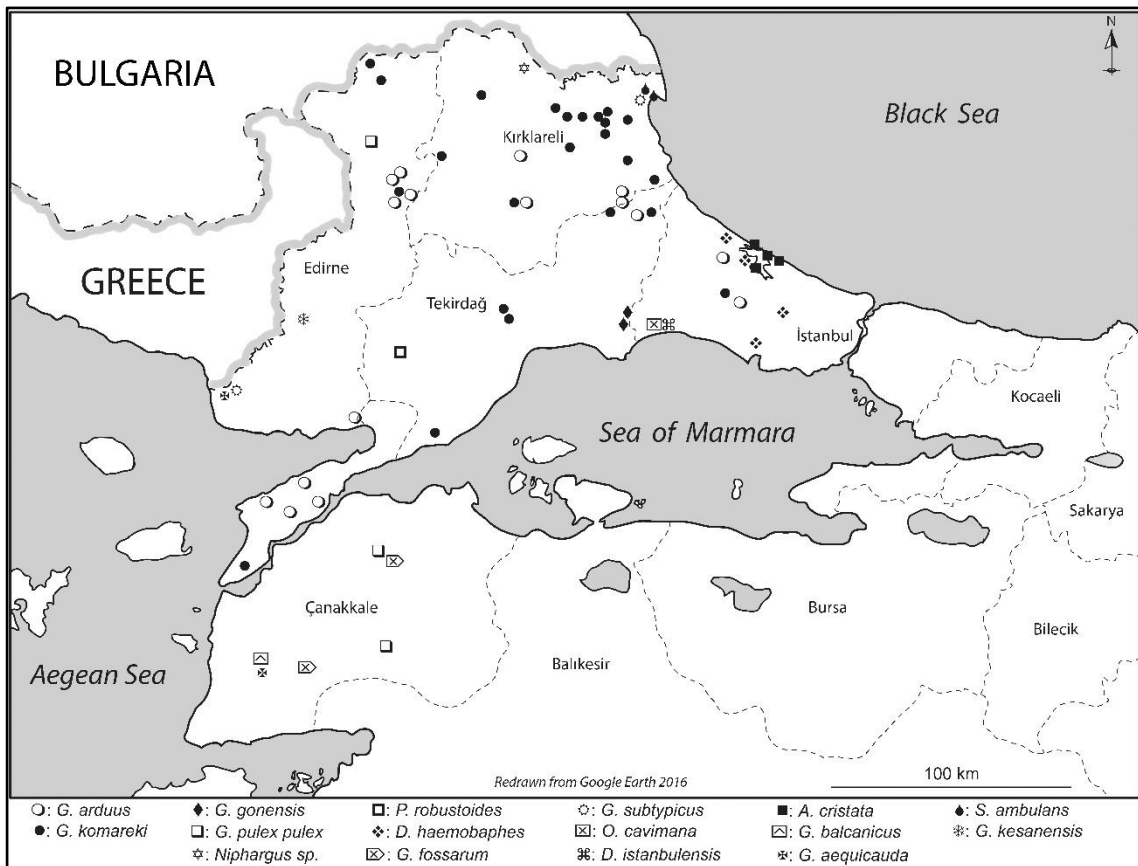


Fig. 1. Study area and distribution of the determined amphipod species (Modified from Google Earth).

Table 1. Descriptive data about the sampling localities and the determined taxa.

No	Locality	Date	Habitat Type	Taxon	n	Province	Leg.	Coordinates
1	Bayrıköy, Gelibolu	02.09.2000	Creek, Stream	<i>G. arduus</i>	24	Çanakkale	N. Ö.	40°22'10.25"N- 26°35'35.24"E
2	Bayrıköy, Çeşme Yalak	02.09.2000	Fountain	<i>G. arduus</i>	31	Çanakkale	N. Ö.	40°21'7.91"N- 26°35'11.35"E
3	Beşyol, Eceabat, Ecelimani Deresi	08.02.2001	Creek, Stream	<i>G. arduus</i>	20	Çanakkale	N. Ö.	40°19'39.65"N- 26°20'37.99"E
4	Behramlı Köyü	01.09.2000	Fountain	<i>G. komareki</i>	56	Çanakkale	N. Ö.	40°7'17.82"N- 26°17'13.63"E
5	Münipbey Deresi, Gelibolu	02.09.2000	Creek, Stream	<i>G. arduus</i>	44	Çanakkale	N. Ö.	40°18'36.54"N- 26°27'26.04"E
6	Yenice, Sofular Köyü	18.08.1999	Fountain	<i>G. gonensis</i>	12	Çanakkale	N. Ö.	40°2'4.84"N- 27°17'58.48"E
7	Ayvacık, Küçükkuyu	17.08.1999	Creek	<i>G. fossarum</i>	6	Çanakkale	N. Ö.	39°35'12.48"N- 26°23'55.15"E
8	Bayramiç Çayı	17.08.1999	Creek, Stream	<i>G. fossarum</i>	11	Çanakkale	N. Ö.	39°47'0.00"N- 26°38'47.01"E
9	Lapseki, Balçılar	12.04.1998	Fountain	<i>G. pulex pulex</i>	14	Çanakkale	N. Ö.	40°10'6.52"N- 26°51'19.80"E
10	Kazdağı Sarıkız etekleri, Tozaltı	05.09.1997	Creek, Stream	<i>G. uludagi</i>	18	Çanakkale	N. Ö.	39°35'38.99"N- 26°52'48.54"E
11	Kocaçarlar, Terzialan	21.04.1997	Stream	<i>G. pulex pulex</i>	15	Çanakkale	N. Ö.	39°55'6.65"N- 27°1'10.41"E
12	Kiremitlik Deresi, Çokal Köyü, Gelibolu	02.09.2000	Creek, Stream	<i>G. komareki</i>	54	Çanakkale	N. Ö.	40°41'54.09"N- 26°59'33.34"E
13	Kayalidere, Çan, Terzialan	20.04.1997	Creek, Stream	<i>Gammarus</i> sp. (<i>immatures</i>)	2	Çanakkale	N. Ö.	40°2'8.44"N- 27°4'7.82"E
14	Ecelimani Deresi, Beşyol, Eceabat	22.08.2001	Creek, Stream	<i>G. arduus</i>	44	Çanakkale	N. Ö.	40°19'41.81"N- 26°20'37.33"E
15	Kavaklı Köyü	17.08.1999	Creek, Fountain	<i>G. balcanicus</i>	22	Çanakkale	N. Ö.	39°47'23.47"N- 26°27'57.96"E
16	Değirmendüzü Köyü, Burgaz Deresi	31.08.2000	Creek, Stream	<i>G. arduus</i>	31	Çanakkale	N. Ö.	40°24'49.41"N- 26°30'30.75"E
17	Ezine, Kestenbol, Hacidere	15.08.1999	Creek, Stream	<i>G. aequicauda</i>	17	Çanakkale	N. Ö.	39°47'21.38"N- 26°20'0.95"E
18	Kafkas Bağları Deresi	13.05.1989	Creek, Stream	<i>G. pulex pulex</i>	35	Edirne	B. Ç. E.	41°38'26.02"N- 26°39'14.80"E
19	Hamzabeyli Deresi	10.09.1990	Creek, Stream	<i>G. komareki</i>	64	Edirne	N. Ö.	41°57'32.74"N- 26°37'34.16"E
20	Gala Gölü	19.06.1986	Lake	<i>G. aequicauda</i>	10	Edirne	N. Ö.	40°45'32.10"N- 26°10'24.49"E
21	Teksiplik altı, Sazlıdere	14.05.1996	Creek, Stream	<i>G. arduus</i>	65	Edirne	N. Ö.	40°39'22.51"N- 26°41'5.15"E
22	Oğulpaşa Deresi	24.10.1995	Creek, Stream	<i>Gammarus</i> sp. (<i>extremities lost</i>)	3	Edirne	N. Ö.	41°27'19.74"N- 26°45'57.95"E
23	Gala Gölü	26.09.1986	Lake	<i>G. aequicauda</i>	9	Edirne	N. Ö.	40°45'53.79"N-26°10'43.61"E
24	Oğulpaşa Deresi- Abalar	24.10.1995	Creek, Stream	<i>G. arduus</i>	62	Edirne	N. Ö.	41°32'14.85"N- 26°44'36.70"E
25	Oğulpaşa Deresi- Şerbettar	17.06.1996	Creek, Stream	<i>G. arduus</i>	28	Edirne	N. Ö.	41°28'44.84"N- 26°50'12.46"E
26	Gala Gölü	17.01.1986	Lake	<i>G. subtypicus</i>	3	Edirne	N. Ö.	40°45'53.79"N-26°10'43.61"E
27	Abalar	11.11.1996	Creek, Stream	<i>G. arduus</i>	36	Edirne	N. Ö.	41°32'45.85"N- 26°44'53.53"E
28	Yaylacık- Çatalca	15.09.2000	Creek, Stream	<i>G. arduus</i>	29	İstanbul	N. Ö.	41°20'4.32"N- 28°14'29.34"E
29	Şamlar Köyü- K. Çekmece	07.09.2000	Lake	<i>D. istanbulensis</i>	6	İstanbul	N. Ö.	41°8'13.92"N- 28°44'34.12"E
30	B. Çekmece Gölü- B. Çekmece	08.09.2000	Lake	<i>D. istanbulensis</i> <i>P. robustoides</i>	11	İstanbul	N. Ö.	41°1'50.46"N- 28°33'43.89"E
31	Celepköy- Terkos Gölü	04.07.2001	Lake	<i>A. cristata</i> <i>P. robustoides</i> <i>D. istanbulensis</i>	5 8 9	İstanbul	N. Ö.	41°22'46.71"N- 28°31'9.17"E
32	Yenitaşlıköy, Kaynakça Deresi	17.09.2000	Creek, Stream	<i>G. komareki</i> <i>G. arduus</i>	28 31	Kırklareli	N. Ö.	41°29'1.70"N- 27°23'15.21"E
33	Çanta Deresi, Silivri	16.09.2000	Creek, Stream	<i>O. cavimana</i> <i>D. istanbulensis</i>	8 12	İstanbul	N. Ö.	41°4'10.62"N- 28°6'16.85"E

Table 1. Continued.

No	Locality	Date	Habitat Type	Taxon	n	Province	Leg.	Coordinates
34	Gökçeali Çıkışı, Çatalca	04.07.2001	Creek, Stream	<i>G. komareki</i>	38	İstanbul	N. Ö.	41°11'48.31"N- 28°26'45.27"E
35	Gürgenli Deresi, Çatalca	15.09.2000	Creek, Stream	<i>G. arduus</i>	25	İstanbul	N. Ö.	41°9'18.83"N- 28°26'41.17"E
36	İstranca Deresi, Ormanlı Köyü, Çatalca	05.09.2000	Creek, Stream	<i>Niphargus</i> sp.	2	İstanbul	N. Ö.	41°23'44.46"N- 28°27'54.96"E
37	Terkos Gölü, Durusu	06.08.2000	Lake	<i>A. cristata</i> <i>P. robustoides</i> <i>D. istanbulensis</i>	4 13 7	İstanbul	N. Ö.	41°18'28.69"N- 28°39'26.33"E
38	Celepköy- Terkos Gölü	04.07.2001	Lake	<i>A. cristata</i> <i>P. robustoides</i> <i>D. istanbulensis</i>	6 17 8	İstanbul	N. Ö.	41°22'23.74"N- 28°31'34.24"E
39	Bulamkdere	01.07.2008	Creek, Stream	<i>G. komareki</i>	52	Kırklareli	B. Ç. E.	41°51'34.67"N- 27°41'17.95"E
40	Yenice (Kadikule)	01.11.1996	Creek, Stream	<i>G. komareki</i>	48	Kırklareli	B. Ç. E.	41°44'2.40"N- 27°38'4.50"E
41	Azmakdere	01.03.2008	Creek, Stream	<i>G. komareki</i>	39	Kırklareli	B. Ç. E.	41°51'30.32"N- 27°36'31.04"E
42	Dupnisa Deresi	01.07.2002	Creek, Stream	<i>G. komareki</i>	27	Kırklareli	B. Ç. E.	41°51'1.36"N- 27°33'51.71"E
43	Üsküpdere	01.11.1996	Creek, Stream	<i>G. arduus</i>	42	Kırklareli	B. Ç. E.	41°40'55.74"N-27°21'37.62"E
44	Armutveren Çeşmesi	01.10.1996	Fountain	<i>G. komareki</i>	48	Kırklareli	B. Ç. E.	41°53'52.23"N- 27°32'25.22"E
45	Askerdere	01.07.2008	Creek, Stream	<i>G. komareki</i>	31	Kırklareli	B. Ç. E.	41°51'5.59"N- 27°48'26.24"E
46	Ürnlü Deresi	01.11.1996	Creek, Stream	<i>G. arduus</i>	28	Kırklareli	B. Ç. E.	41°40'17.89"N- 26°59'27.22"E
47	Bulamkdere	01.07.2008	Creek, Stream	<i>G. komareki</i>	50	Kırklareli	B. Ç. E.	41°49'51.20"N- 27°47'46.37"E
48	Kızılağaç- Pabuçdere	01.11.1996	Creek, Stream	<i>G. komareki</i>	43	Kırklareli	B. Ç. E.	41°41'42.33"N- 27°56'34.28"E
49	Demirköy- Alabalıkdere	01.11.1996	Creek, Stream	<i>G. komareki</i>	41	Kırklareli	B. Ç. E.	41°48'51.61"N- 27°48'15.87"E
50	Madara Deresi	01.07.2008	Creek, Stream	<i>G. komareki</i>	18	Kırklareli	B. Ç. E.	41°52'2.02"N- 27°54'14.83"E
51	Gölet- Dereköy	18.10.1996	Pond	<i>Niphargus</i> sp. (<i>extremities lost</i>)	1	Kırklareli	B. Ç. E.	41°55'35.52"N- 27°22'50.49"E
52	Koçfaz	10.06.1987	Creek, Stream	<i>G. komareki</i>	34	Kırklareli	B. Ç. E.	41°56'17.28"N- 27°9'16.62"E
53	Hamam Gölü	01.03.1999	Lake	<i>S. ambulans</i>	7	Kırklareli	B. Ç. E.	41°49'26.69"N- 27°57'50.77"E
54	İbriktepe- Kocabayır Deresi	23.07.1989	Creek, Stream	<i>G. kesanensis</i>	8	Kırklareli	B. Ç. E.	41°1'20.37"N- 26°29'55.83"E
55	Mert Gölü	15.03.1999	Lake	<i>G. subtypicus</i>	7	Kırklareli	B. Ç. E.	41°51'56.47"N-27°58'21.22"E
56	Erikli Gölü	15.03.1999	Lake	<i>S. ambulans</i>	5	Kırklareli	B. Ç. E.	41°53'16.02"N- 27°59'40.63"E
57	Evrenli, Vize	31.07.2000	Stream, Fountain	<i>G. arduus</i>	36	Kırklareli	N. Ö.	41°30'56.24"N- 27°51'34.16"E
58	Çakıllı, Evrenli, Vize	31.07.2000	Stream	<i>G. arduus</i>	29	Kırklareli	N. Ö.	41°31'2.82"N- 27°51'45.92"E
59	Kıyıköy Deresi, Vize	30.07.2000	Creek, Stream	<i>G. komareki</i>	46	Kırklareli	N. Ö.	41°38'17.62"N- 28°4'38.03"E
60	Yeniköy, Şarköy	02.09.2000	Fountain	<i>G. arduus</i>	28	Tekirdağ	N. Ö.	40°37'3.14"N- 27°7'5.42"E
61	Değirmenköy, Önerler arası	16.09.2000	Creek, Stream	<i>G. gonensis</i>	16	Tekirdağ	N. Ö.	41°9'4.80"N- 27°57'5.64"E
62	Değirmenköy Deresi, Çorlu	16.09.2000	Creek, Stream	<i>G. gonensis</i>	20	Tekirdağ	N. Ö.	41°6'32.18"N- 27°58'23.32"E
63	Bahçeköy Deresi, Saray	03.07.2001	Creek, Stream	<i>G. komareki</i>	62	Tekirdağ	N. Ö.	41°30'23.16"N- 28°3'9.70"E
64	Şerefi Deresi, Yeniceköy, Çorlu	17.09.2000	Creek, Stream	<i>G. komareki</i>	53	Tekirdağ	N. Ö.	41°1'34.58"N- 27°43'54.23"E
65	Osmanlı Deresi, Osmanlı	21.08.2001	Creek, Stream	<i>G. komareki</i>	41	Tekirdağ	N. Ö.	41°2'58.32"N- 27°23'35.81"E
66	Karademir Barajı, Işakça	22.08.2001	Dam Lake	<i>P. robustoides</i>	20	Tekirdağ	N. Ö.	40°57'14.19"N- 26°59'7.89"E
67	Kasatura Deresi, Saray	31.07.2000	Creek, Stream	<i>G. arduus</i>	37	Tekirdağ	N. Ö.	41°27'11.53"N- 27°55'28.09"E
68	Çımarlı Deresi, Şarköy	22.08.2001	Creek, Stream	<i>G. komareki</i>	41	Tekirdağ	N. Ö.	40°37'10.06"N- 27°5'58.80"E

Dikerogammarus istanbulensis Özbek & Özkan, 2011

Amathillina cristata Sars, 1894

Family Pontogammaridae Bousfield, 1977

Pontogammarus robustoides Sars, 1894

Family Niphargidae Bousfield, 1977

Niphargus sp.

Family Talitridae Rafinesque, 1815

Orchestia cavimana Heller, 1865

Family Crangonyctidae Bousfield, 1973

Synurella ambulans F. Müller, 1846

The genus *Gammarus* was represented by ten species throughout the study area. *Gammarus komareki* was the prevalent species and was found at 21 localities. It was followed by *G. arduus* which was found at 19 stations. On the other hand, *G. balcanicus*, *G. uludagi* and *O. cavimana* were the rarest species which were found at one locality only. Some of the sampled amphipod specimens were in juvenile stage (those at 13th station), some of them were damaged and had lost their extremities (those at 22nd and 51st stations) and consequently they were identified to the generic level (Fig. 1, Table 1).

Discussion

The Turkish Thrace Region (of Eastern Thrace or European Turkey) is a geographical part of South-eastern Europe and was surrounded by Greece, Bulgaria, the Black Sea, the Sea of Marmara and the Aegean Sea. Therefore, Ponto-Caspian and Mediterranean forms can inhabit together with the freshwater ones in this region. The coastal lagoons and lakes or estuarine sections of rivers flowing into the Black Sea and the Sea of Marmara are preferred by the Ponto-Caspian amphipods, while the coastal lagoons in the western part of the area are mainly preferred by the Mediterranean forms. The central part of the region is the main distribution area of purely freshwater species such as *G. arduus* (Fig. 1).

There are some studies about the distribution of freshwater amphipod species of both Greece and Bulgaria which are the neighbours of the study area (KARAMAN & PINKSTER 1977a, b, 1987, ANDREEV 2001, GRABOWSKI & PEŠIĆ 2007, NTAKIS et al. 2015).

Freshwater amphipod species of the Turkish Thrace Region have not been studied comprehensively up-to-date. Although there are some studies on the distribution of the amphipod species in the mentioned area, they are less in number and deal only with a few species (YEŞILMEN & KIRGIZ 1996, KOCATAŞ et al. 2003, ÇAMUR-ELIPEK & KIRGIZ 2008, FIŞER et al. 2009, ÖZBEK & ÇAMUR-ELIPEK 2010,

ÖZBEK & ÖZKAN 2010, ÖZBEK 2011a, ÖZBEK & ÖZKAN 2011, REWICZ et al. 2016).

Gammarus aequicauda has a wide distribution area including the Eastern Mediterranean and the Black Sea. The species has a euryhaline character and is well known from the lakes, lagoons and river mouths located in the coasts of western and northern Anatolia (USTAOĞLU et al. 2000, ÖZBEK & USTAOĞLU 1998, ÖZBEK et al. 2015). In the present study, *G. aequicauda* was reported from the Ezine District and Gala Gölü which is a shallow wetland area located near the estuary of Meriç (Maritza) River.

Gammarus arduus was firstly identified from the Tekirdağ Province. It is widely distributed in European Turkey and neighbouring areas (e.g. Bulgaria, Greece and Albania) (KARAMAN & PINKSTER 1977a, GRABOWSKI & PEŠIĆ 2007). *Gammarus arduus* is purely a freshwater species and the analysed specimens were sampled from fountains and streams in this study. The species is one of the most abundant and was found at 18 localities in Çanakkale, Edirne, İstanbul, Kırklareli and Tekirdağ Provinces.

Gammarus balcanicus is a well-known species distributed both in Turkey and Europe. There are many records of the species from the Anatolian part of Turkey (KARAMAN & PINKSTER 1977b, ÖZBEK & USTAOĞLU 2005, ÖZBEK et al. 2009) but it was found only at one locality in the present study (Table 1). Kavakli, where *G. balcanicus* was found, is situated in the Anatolian part of Turkey. So, *G. balcanicus* could not be found in European Thrace of Turkey in this study.

Gammarus fossarum was sampled from two localities, both in the Anatolian part of Çanakkale Province (Table 1). The species is similar to *G. balcanicus* in term of distribution in the present study, was not found in the Turkish Thrace Region. On the other hand, there are some records of this species from the western part of Anatolia (KARAMAN & PINKSTER 1977a, BALIK et al. 2002, ÖZBEK 2011b).

Gammarus gonensis was identified from the Gönen River, Balıkesir Province which is adjacent to the Çanakkale Province. The localities given in the present study (Table 1) are new records other than its type locality. Additionally, the species is firstly reported from Europe in the present study.

Gammarus kesianensis is the unique blind *Gammarus* species and was recently identified by the first and the third authors of this study. The type locality of *G. kesianensis* is Keşan, which is a district in Edirne Province. In the present study, the samples were collected from the type locality of the species.

Gammarus komareki is a widely distributed

species both in the European and Anatolian parts of Turkey. The species is also distributed in Bulgaria, Greece, Romania, Russia, around the Black Sea and Iran (KARAMAN & PINKSTER 1977a, GRABOWSKI & PEŠIĆ 2007, ÖZBEK 2008).

Gammarus pulex pulex has a wide distribution in Turkey and was found at three localities in this study (ÖZBEK 2011b; Table 1). It was reported from various localities in Europe, Siberia, Afghanistan and China (KARAMAN & PINKSTER 1977a).

Gammarus subtypicus has similar ecological requirements with *G. aequicauda* and frequently shares the same habitats with it. In the present study, they were found together with *G. aequicauda* in the Gala Lake. In addition, it was sampled from the Mert Lake which is a lagoon on the Black Sea coast, near İğneada District. There are many records of this species from Turkey (ÖZBEK 2011b).

Gammarus uludagi was identified from the Uludağ Mountain and is distributed on the Lesbos Island in addition to the western part of Turkey (KARAMAN & PINKSTER 1977a, ÖZBEK 2011b). In this study, the species was found only from one station located in the foothills of Kazdağı (Ida) Mountains (Table 1). There are no records of *G. uludagi* in the European part of Turkey.

Dikerogammarus istanbulensis is an endemic species which was identified recently by the first and second author of this study. The type locality of the species was reported as Silivri District, Istanbul Province (ÖZBEK & ÖZKAN 2011). The species is reported for the first time from the localities other than its type locality. The new records of the species are the Terkos, Büyük Çekmece and Küçük Çekmece Lakes. All of the given lakes have brackish character and are located on the coast of the Black Sea, Istanbul Province.

Amathillina cristata is a Ponto-Caspian spe-

cies which was recently recorded from Turkey for the first time from Celepköy, Terkos Lake (ÖZBEK & ÖZKAN 2010). The present specimens were also collected from the same lake on different dates.

Pontogammarus robustoides is a highly invasive Ponto-Caspian species. There are many records about the invasion route of the *Pontogammarus* and *Dikerogammarus* species towards the European inland waters even to the Baltic Sea (BIJ DE VAATE et al. 2002). *Pontogammarus robustoides* has been previously recorded from the lakes located in the southern part of the Sea of Marmara (ÖZBEK 2011a). The species was found from two localities in the present study: Terkos Lake and Karademir Dam Lake in İshakça town.

We found a few specimens of *Niphargus* from two localities (Table 1). Some of the specimens were in bad conditions and had lost their extremities and the other two specimens were females. So, the samples were determined to generic level.

Orchestia cavimana was firstly recorded from the Turkish Thrace Region in 2008. There are many records of the species from the Black Sea coasts and from the lakes surrounding the Sea of Marmara (ÇAMUR-ELIPEK & KIRGIZ, 2008, ÖZBEK 2011a). In the present study, the species was sampled from the Çanta Stream, Silivri.

Synurella ambulans was sampled from two localities in this study which are the wetlands located on the western coast of the Black Sea. Both of them were connected to the sea with channel systems. There are some records of *S. ambulans* from the Abant Lake, Beyşehir Lake and Antalya Province, Turkey (RUFFO 1974).

Because of its geographical position, Turkey has a rich fauna and flora. In order to reveal the diverse fauna of epigeal freshwater amphipods of Turkey, further taxonomic studies are needed.

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