

Recent Ostracoda (Crustacea) Fauna of the Black Sea Coasts of Turkey

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Abstract: This study was performed to determine the Ostracoda fauna of the Black Sea coasts of Turkey. The material collected from 34 stations in June, July, and August of 1995 was evaluated and classified. The results of this classification are as follows: 24 species (*Ilyocypris inermis*, *Candona* sp., *Cyprinotus inaequalis*, *Heterocypris salina*, *Heterocypris incongruens*, *Cypridopsis vidua*, *Potamocypris villosa*, *Potamocypris steueri*, *Limnocythere inopinata*, *Leptocythere multipunctata*, *Callistocythere mediterranea*, *Callistocythere diffusa*, *Costa edwardsii*, *Aurila convexa*, *Cyprideis torosa*, *Pontocythere bacesei*, *Eucytherura bulgarica*, *Microcytherura nigrescens*, *Loxococoncha pontica*, *Loxococoncha rhomboidea*, *Xestoleberis cornelii*, *Sclerochilus gewmülleri*, *Paradoxostoma intermedium* and *Paradoxostoma guttatum*) and 3 subspecies (*Cythereis rubra pontica*, *Xestoleberis aurantia aurantia* and *Xestoleberis aurantia acutipenis*) were determined. Twelve of these species (*Potamocypris steueri*, *Leptocythere multipunctata*, *Callistocythere mediterranea*, *Callistocythere diffusa*, *Pontocythere bacesei*, *Eucytherura bulgarica*, *Microcytherura nigrescens*, *Loxococoncha pontica*, *Xestoleberis cornelii*, *Sclerochilus gewmülleri*, *Paradoxostoma intermedium* and *Paradoxostoma guttatum*) and three subspecies (*Cythereis rubra pontica*, *Xestoleberis aurantia aurantia* and *Xestoleberis aurantia acutipenis*) are new records for the Ostracoda fauna of Turkey.

Key Words: Ostracoda, Crustacea, Black Sea, Fauna.

Türkiye-Karadeniz Kıyılarının Güncel Ostrakoda (Crustacea) Faunası

Özet: Bu çalışma Karadeniz kıyılarının ostrakod (Crustacea) faunasını belirlemek için yapılmıştır. 1995 yılının haziran, temmuz ve ağustos aylarında 34 istasyondan toplanan materyal değerlendirilmiş ve sınıflandırılması yapılmıştır. Bu sınıflandırma sonucunda 24 tür (*Ilyocypris inermis*, *Candona* sp., *Cyprinotus inaequalis*, *Heterocypris salina*, *Heterocypris incongruens*, *Cypridopsis vidua*, *Potamocypris villosa*, *Potamocypris steueri*, *Limnocythere inopinata*, *Leptocythere multipunctata*, *Callistocythere mediterranea*, *Callistocythere diffusa*, *Costa edwardsii*, *Aurila convexa*, *Cyprideis torosa*, *Pontocythere bacesei*, *Eucytherura bulgarica*, *Microcytherura nigrescens*, *Loxococoncha pontica*, *Loxococoncha rhomboidea*, *Xestoleberis cornelii*, *Sclerochilus gewmülleri*, *Paradoxostoma intermedium*, *Paradoxostoma guttatum*) ve 3 alt tür (*Cythereis rubra pontica*, *Xestoleberis aurantia aurantia*, *Xestoleberis aurantia acutipenis*) saptanmıştır. Bu türlerden 12 tanesi (*Potamocypris steueri*, *Leptocythere multipunctata*, *Callistocythere mediterranea*, *Callistocythere diffusa*, *Pontocythere bacesei*, *Eucytherura bulgarica*, *Microcytherura nigrescens*, *Loxococoncha pontica*, *Xestoleberis cornelii*, *Sclerochilus gewmülleri*, *Paradoxostoma intermedium*, *Paradoxostoma guttatum*) ile üç alt tür (*Cythereis rubra pontica*, *Xestoleberis aurantia aurantia*, *Xestoleberis aurantia acutipenis*) Türkiye ostrakod faunası için yeni kayıttır.

Anahtar Sözcükler: Ostracoda, Crustacea, Karadeniz, Fauna

Introduction

Having a pair of calcified valves, ostracods can be found as fossils in sediments. This makes them a useful tool in palaeontological studies. There are different ostracod species that live in different aquatic environments (e.g., marine brackish and freshwaters). Consequently, they possess another important pattern for determining the characteristics of such aquatic habitats over geological time. Due to geological changes,

since the Miocene epoch (15 mya), the fauna and the flora of the Black Sea have changed over time. These changes may have affected the present ostracod fauna in the area, which may be considered one of the most important parts of the biological richness of Anatolia. Ostracods, being part of the Black Sea fauna, have a wide distribution in the area, making them useful indicator species of such geological changes.

The first studies on the ostracods fauna of Anatolia were conducted by Schäfer (1), Hartmann (2), and Gülen (3-6). Since then, such taxonomic studies have mostly been concentrated in different freshwater habitats of Turkey (7-16). Relatively few studies have been performed to determine the marine Ostracoda fauna of Turkey. For example, such studies were done in different parts of the Marmara Sea and Aegean Sea (17, 20), in Bosphorus-İstanbul (18), around the Black Sea entrance-İstanbul (19), in Izmit harbour (21), and at Sinop (25). Other studies performed in the northern and southwest parts of Black Sea ostracods were by Schornikov (22, 23) and Caraion (24), respectively. The purpose of the present study was to determine the ostracod fauna of Turkey along the Black Sea coast.

Materials and Methods

Samples were collected from 34 stations along the Black Sea coast on June, July and August in 1995 (Figure 1).

Ostracods are microscopic invertebrate animals that mostly prefer calm waters. Because of their preferences, calm water habitats were selected as sampling stations. Many harbours, mouths of streams and inside seaports were chosen for the study stations (Table 1). Thirty-four localities and a list of the species are shown in Table 2.

Material was collected with a plankton net of Müller fabric and fixed in 4% formaldehyde *in situ*. In the laboratory, the samples were washed under pressurised tap water. The selected ostracods specimens were then conserved in 70 % alcohol. In some sampling stations

Table 1. Shows the numbers of the stations, the date and the location.

Station No.	Date	Name of stations (Location)
1	03.06.1995	İğneada-Kırklareli
2	10.06.1995	Kilyos Seaport -İstanbul
3	12.06.1995	In front of Rumeli lighthouse-İstanbul
4	17.06.1995	Inside of breakwater, Şile-İstanbul
5	02.07.1995	Kerpe public beach, Kandıra-Kocaeli
6	03.07.1995	Küçükboğaz estuary, Adapazarı
7	03.07.1995	Akçakoca Seaport, Akçakoca-Bolu
8	04.07.1995	Gülüs estuary, Ereğli-Zonguldak
9	10.07.1995	Amasra public beach, Amasra-Bartın
10	14.07.1995	Doğanyurt seashore, Kastamonu
11	15.07.1995	Yakaören seashore, Kastamonu
12	15.07.1995	In front of Sinop castle, Sinop
13	18.07.1995	Sarmısaklı stream-1 estuary, Sinop
14	25.07.1995	Samsun harbour, Samsun
15	28.07.1995	In front of T.C.D.D. directorate building, Samsun
16	03.08.1995	Çınarsu stream estuary, Ordu
17	04.08.1995	Ünye estuary, Ordu
18	04.08.1995	Bolaman seashore Ordu
19	04.08.1995	Perşembe seashore, Ordu
20	07.08.1995	Piraziz-entrance, Giresun
21	07.08.1995	Giresun harbour, Giresun
22	07.08.1995	Near Giresun highway-exit between Trabzon and Giresun
23	08.08.1995	Çavuşlu village, Giresun
24	10.08.1995	Beşikdüzü seashore, Trabzon
25	18.08.1995	Akçaabat-exit, Trabzon
26	15.08.1995	Inside Arsin breakwater, Trabzon
27	16.08.1995	Inside Araklı breakwater, Trabzon
28	18.08.1995	Rize breakwater, Rize
29	18.08.1995	In front of Rize Teachers' Hostel, Rize
30	20.08.1995	Çayeli exit, Balıkdere fishing harbour, Rize
31	25.08.1995	Fındıklı entrance, nearly the highway, Rize
32	30.08.1995	Arhavi entrance, inside breakwater, Artvin
33	30.08.1995	Hopa seaport, Artvin
34	30.08.1995	Kemalpaşa entrance, fishing harbour, Artvin

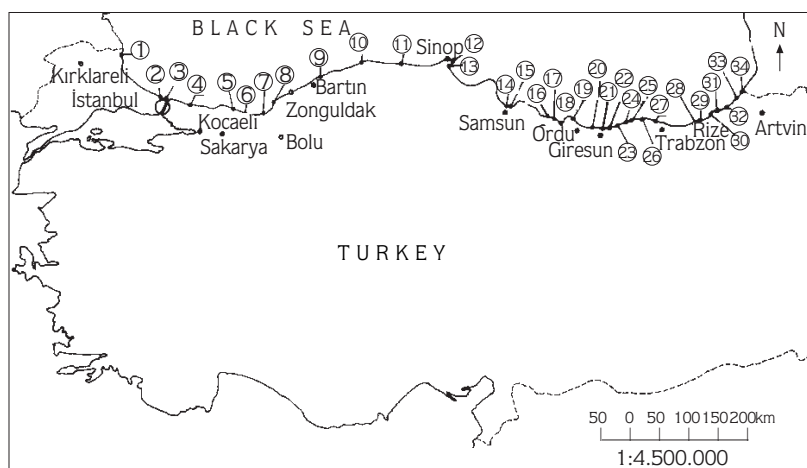


Figure 1. Sampling stations along the Black Sea coast of Turkey.

Table 2. Species and their localities

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34			
<i>I. inermis</i>										x			x																								
<i>C. sp.</i>											x																										
<i>C. inaequalis</i>																	x																				
<i>H. salina</i>	x		x																															x			
<i>H. incongruens</i>												x																									
<i>C. vidua</i>																x																					
<i>P. villosa</i>								x		x																											
<i>P. steueri</i> *																					x																
<i>L. inopinata</i>	x																																				
<i>L. multipunctata</i> *					x																						x										
<i>C. mediterranea</i> *																							x	x										x			
<i>C. diffusa</i> *								x																													
<i>C. edwardsii</i>								x																													
<i>C. rubra pontica</i> *																					x																
<i>A. convexa</i>	x			x	x																																
<i>C. torosa</i>	x				x	x																															
<i>P. bacesoi</i> *				x	x						x				x									x													
<i>E. bulgarica</i> *					x							x												x													
<i>M. nigrescens</i> *												x																									
<i>L. pontica</i> *		x	x		x									x											x		x						x	x	x	x	
<i>L. rhomboidea</i>				x	x		x				x											x		x	x	x	x	x	x	x	x						
<i>X. cornelii</i> *			x																																		
<i>X. aurantia aurantia</i> *				x																	x	x															
<i>X. aurantia acutipenis</i> *					x																														x		
<i>S. gewmülleri</i> *								x																												x	
<i>P. intermedium</i> *			x		x														x		x		x														
<i>P. guttatum</i> *			x								x																										x

* New record for Ostracoda fauna of Turkey.

only ostracod carapaces were encountered. In such cases, the carapaces were put into dry micropalaeontological slides and kept for further examination. Taxonomic preparation of extremities was carried out in lactophenol under a binocular microscope with special needles. Species determination was done after examining the extremities and shell morphology under a light microscope. Illustrations of shells and other soft body parts including the reproductive organs were drawn with a camera lucida.

Results

During the species identification, different taxonomic keys were used, among which Hartman and Puri (26) and Kempf (27, 28) were considered important sources.

Ilyocypris inermis Kaufmann, 1900

Material: Station 10, 3 individuals and 5 valves; Station 13, 1 individual and 3 valves.

I. inermis was encountered at stations 10 and 13, where two creeks (Doğanyurt and Sarmısaklı) meet the

Black Sea. Previously this species has been reported from two other places in Turkey (İzmir and Lake İznik) (7, 11). This is possibly the third reporting of this species. The species is also known from Sweden and Central Asia (29, 30).

Candona sp.

Material: Station 10, 6 individuals and 6 valves.

Only one species of the genus *Candona* was encountered at Doğanyurt. It is possibly *C. schweyeri* but with a lack of supporting evidence. For example, no males were found, thus it is called *Candona sp.* for now.

Cyprinotus inaequalis Bronstein, 1928

Material: Station 17, 4 individuals.

Previous distribution of the species in Turkey includes Gaziantep (2); Kütahya (4); Eskişehir, Bilecik, Bursa, Antalya, Bolu, Zonguldak (5); İzmir (7); Balıkesir (8); İznik and Sapanca lakes (11); Sinop (25); Kütahya, Eskişehir, Aydın, Antalya, Antakya, Çankırı, Amasya, Sivas, Nevşehir, Denizli, Aksaray (12).

The species is also known from northern Caucasia (30); Greece (31); England, the Netherlands, Romania, Bulgaria (32); Iran, Pakistan (2). Note that *C. inaequalvis* is considered to be a synonym of *H. salina* but at the moment I prefer to keep them as two distinct species. *C. inaequalvis* was encountered at the origin of Ünye creek. This species displays a broader distribution in Turkey. It is possible to find the species in most kinds of freshwater habitats, and brackish waters as well.

Heterocypris salina (Brady, 1886) Sars, 1890

Material: Station 1, numerous; Station 3, numerous; Station 30, numerous.

Old records of the species from Turkey include Burdur, Denizli, İzmir, Aydın and Muğla (33); Burdur, Denizli, İzmir, Aydın and Muğla (5); Bergama-İzmir (7); Lake Küçükçekmece-İstanbul (10); Lake Büyükçekmece-İstanbul (13).

The species is also known from Europe (34); Sweden, Germany, France, (35); Azore Islands, North Africa, West Asia (29); Southeast Anatolia, (2) Bulgaria (36); Kiev, environs of Kharkov, Kherson, Volga, Solyanka creek, Lake Charkhal, Lake Sarpa, Lake Hazar, North of Caucasia, Lake Cherepashe, South Ural and Omsk (30).

H. salina was encountered at the coasts of Iğneada-Rumeli Feneri, and Çayeli. It seems that there are several morphological similarities between this species and the previous species, *C. inaequalvis*, considering them as the same species. However, at the moment, they are left as separate.

Heterocypris incongruens (Ramdohr, 1808) Claus, 1892

Material: Station 12, 1 individual.

Previous records from Turkey are as follows: Antalya, Antakya, (2); Eskişehir, İzmir (4); Aydın, Bolu, Denizli, Isparta, Kastamonu, Zonguldak (5); İzmir (7); Ayvalık (8); Lake Küçükçekmece-İstanbul (10); Lake Büyükçekmece-İstanbul (13).

The species is cosmopolitan. *H. incongruens* was found at station 12. This species, which is known as a Gondwana relict, is found on almost every continent.

Cypridopsis vidua (O.F. Müller, 1776) Brady, 1867

Material: Station 16, numerous.

C. vidua has been recorded from Eskişehir (4); Gökçeada, İstanbul, Bolu, Zonguldak, Kırklareli (5); Rize,

Trabzon, Kars, Van, İstanbul, Balıkesir (6); Lake Sapanca and Lake İznik (11); Lake Terkos (14); Lake Büyükçekmece-İstanbul (13); İstanbul (15).

In general, the species is also known from northern and central Europe, North and South America, Azore Islands (34); North and East Asia (29); Bulgaria, Yugoslavia (32, 37); Belgium (38); Wales (39); Luxembourg (40); France (41); Poland (42); Europe, Asia, North America (35); European parts of Russia, Caucasia, Siberia, East of Voroshilov, Ussuriisk, North America (30).

C. vidua was encountered at station 16, where Çınarsu creek-Ünye meets the Black Sea. Due to its cosmopolitan characteristics, this species can be found in almost all types of fresh and brackish waters.

Potamocypris villosa (Jurine, 1820) Sars, 1890

Material: Station 8, 2 individuals and 5 valves; Station 10, 25 individuals.

Old records of the species from Turkey include İzmir (7); Lake Küçükçekmece-İstanbul (10); Lake İznik (11); Elazığ, Van, Rize, İstanbul (12); Lake Büyükçekmece-İstanbul (13); İstanbul (15).

P. villosa is known from Caucasia, central Asia, Europe (29); Afghanistan (2); Wales (39); Luxembourg (40); Germany, (43); Spain, Belgium, Luxembourg (44); Germany, Great Britain, Norway, Poland, Yugoslavia, Afghanistan, Belgium, Luxembourg and Sweden (45); Tabard, Karasu, Caucasia, Batumi, Europe, North America (Patagonia) and central Asia (30).

P. villosa was collected at Doğanıyurt where Gülüs creek meets the sea. Detailed information about the general distribution of the species is available in the findings, regarding the species' world-wide distribution including America, Asia and Europe. This species was found within its known distribution in Turkey.

Potamocypris steueri Klie, 1935

Material: Station 20, 1 individual and 2 valves.

This is a new record for Turkey, but the species is known from Egypt, Algeria, Italy, Yugoslavia, Bulgaria (45), and the environs of the Caspian Sea (30).

P. steueri was encountered at Piraziz. When one looks at the general distribution of this species, it is possible to say that *P. steueri* is of Tethys origin.

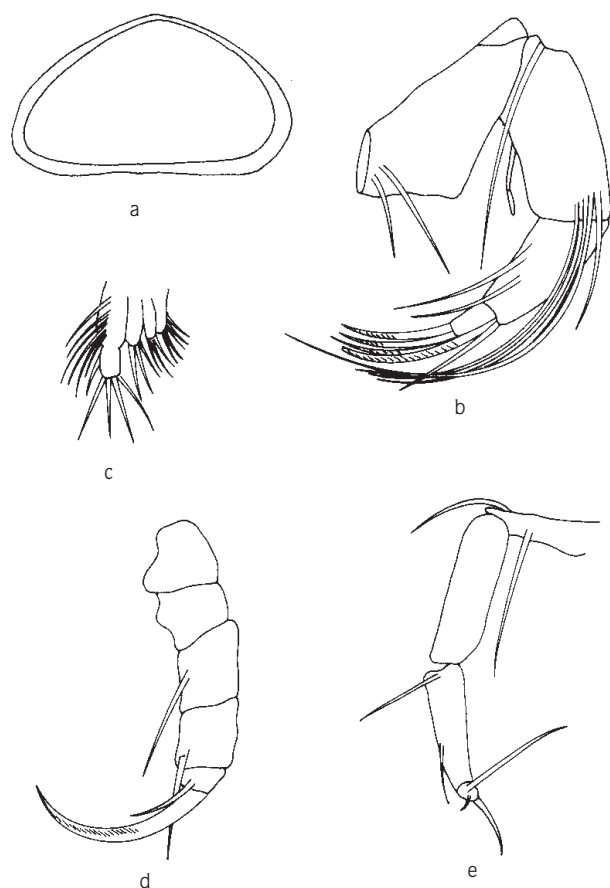


Figure 2. *Potamocypris steueri* Klie, 1938
 a) Internal view of right valve, female 5x10
 b) Second Antenna, female 5x40
 c) Maxilla, female 5x40
 d) Second thoracopod, female 5x40
 e) Third thoracopod, female 4x40

***Limnocythere inopinata* (Baird, 1843) Brady, 1867**

Material: Station 1, numerous.

Commonly known from Lake Van (6); Lake Büyükçekmece-İstanbul (13) and İstanbul (15). The general distribution of its species includes the Soviet Union, Europe, Sweden, Norway, Germany, Switzerland, the Netherlands and the Baltic Sea. (30).

L. inopinata was caught from Iğneada-Kırklareli. Its distribution includes the former Soviet Union and Europe (30). In Turkey, this species is known from Lake Van (5, 6), Büyükçekmece Lake-İstanbul (13), Bentler-İstanbul (15) and the Black Sea (in this study).

***Leptocythere multipunctata* (Seguenza, 1883) Ruggieri, 1950**

Material: Station 5, 1 individual and 1 valve; Station 27, 3 individuals and 1 valve.

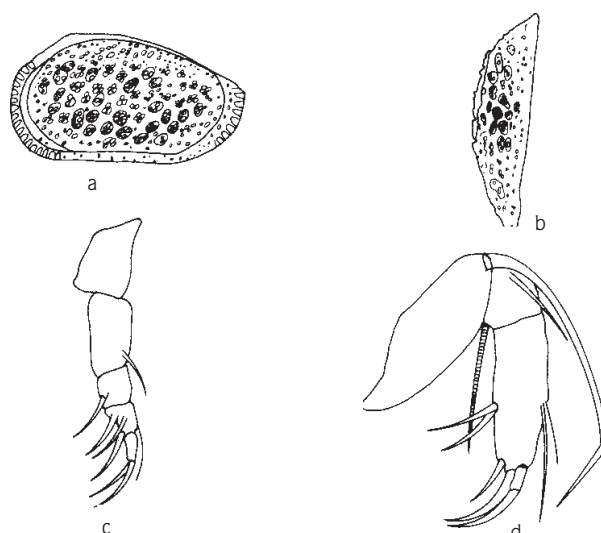


Figure 3. *Leptocythere multipunctata* (Seguenza, 1883) Ruggieri, 1950
 a) External view of left valve, female 7x10
 b) Dorsal view of left valve, female 7x10
 c) First antenna, female 5x40
 d) Second antenna, female 5x40

Previously, this species was known from the Black Sea and the Mediterranean Sea (24), Karangat, the Mediterranean Sea, Crimea and Caucasian coasts, the Northwest region and Romanian coasts, the Ketch Strait, and the Azov Sea (46).

L. multipunctata was collected from Kerpe and Araklı coasts. It is a new record for Turkey. The species was found within its known general distribution.

***Callistocythere mediterranea* (Müller, 1894) Morkhoven, 1963**

Material: Station 23, 1 individual and 1 valve; Station 24, 1 individual and 1 valve; Station 31, 1 individual.

This species is a new record for Turkey but is known from the Black Sea, the Azov Sea (23), Karangat, the Mediterranean Sea, Crimea and Caucasian coasts, Bulgaria, the Northwest region and Romanian coasts (46). *C. mediterranea* was encountered at Çavuşlu village, Beşikdüzü and Fındıklı coasts. Mediterranean originated species.

***Callistocythere diffusa* (Müller, 1894) Morkhoven, 1963**

Material: Station 5, 5 individuals and 4 valves.

This is a new record for Turkey. *C. diffusa* was found at Kerpe. In general, this species prefers brackish waters. In this study, it was found within its known distribution.

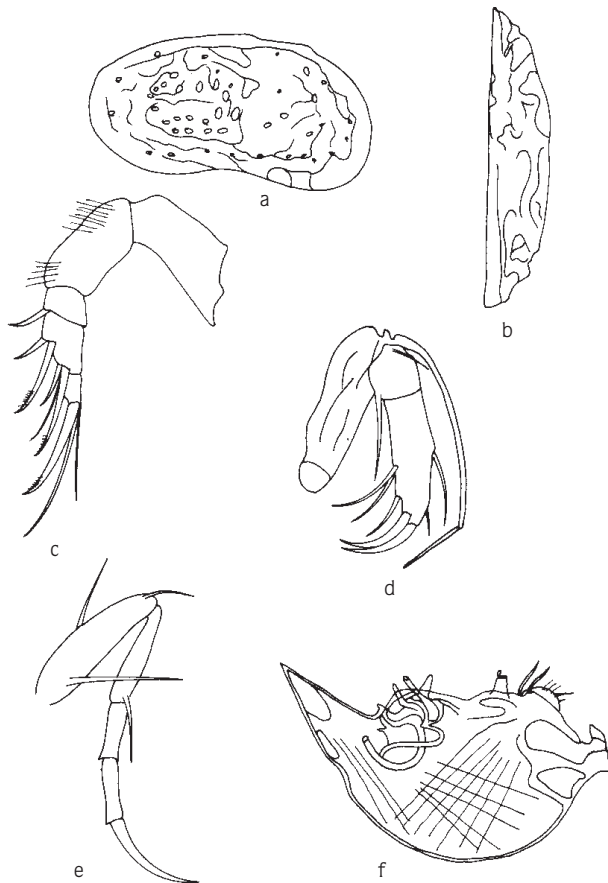


Figure 4. *Callistocythere mediterranea*. (Müller, 1894) Morkhoven, 1963
 a) External view of right valve. Male 7x10
 b) Dorsal view of right valve, male 7x10
 c) Male, first antenna 5x40
 d) Male, second antenna 5x40
 e) Male, third thoracopod 5x40
 f) Reproductive organ 5x40

The Black Sea and the Azov Sea (23), Black Sea, Crimea and Romanian coasts, Adriatic, Mediterranean Sea, Atlantic Ocean, coast of France (24), Karangat, Crimea, Caucasus, and Romanian coasts (46) are previous records of the species.

Costa edwardsii (Roemer, 1838) Howe, 1955

Material: Station 5, 1 valve.

In Turkey, this species is known from Sea of Marmara (17); Southern Bosphorus (18); Aegean Sea (20); İzmit Bay (21).

However, generally, it has a wide distribution including Paros and Naxos Island, Greece, Aegean Sea

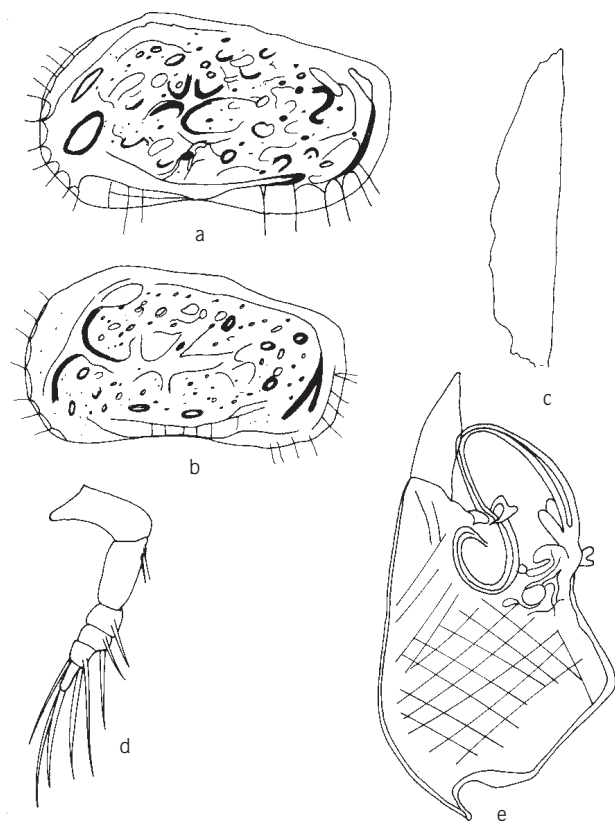


Figure 5. *Callistocythere diffusa* (Müller, 1894) Morkhoven, 1963
 a) External view of left valve, male 7x10
 b) External view of left valve, female 7x10
 c) Dorsal view of left valve, female 7x10
 d) First antenna, male 5x40
 e) Reproductive organ 5x40

(47); Gulf of Napoli and Adriatic Sea (48); Evros Delta, Greece (49); Black Sea, Azov Sea (23); Romania (24); Mediterranean Sea and Atlantic Sea (46). *C. edwardsii* was taken from Kerpe. It shows a wider distribution in brackish and marine waters. Detailed information is given above. *C. edwardsii* (previously recorded from the Marmara and Aegean Seas) was found within its general distribution.

Cythereis rubra pontica Dubowsky, 1939

Material: Station 19, 1 individual and 1 valve.

Previously, this species was only known from Romanian coasts (24).

C. rubra pontica was only found from the coast at Perşembe and is a new species for Turkey. Finding the species on the coasts of Turkey allows us to extend its general distribution in a southwesterly direction.

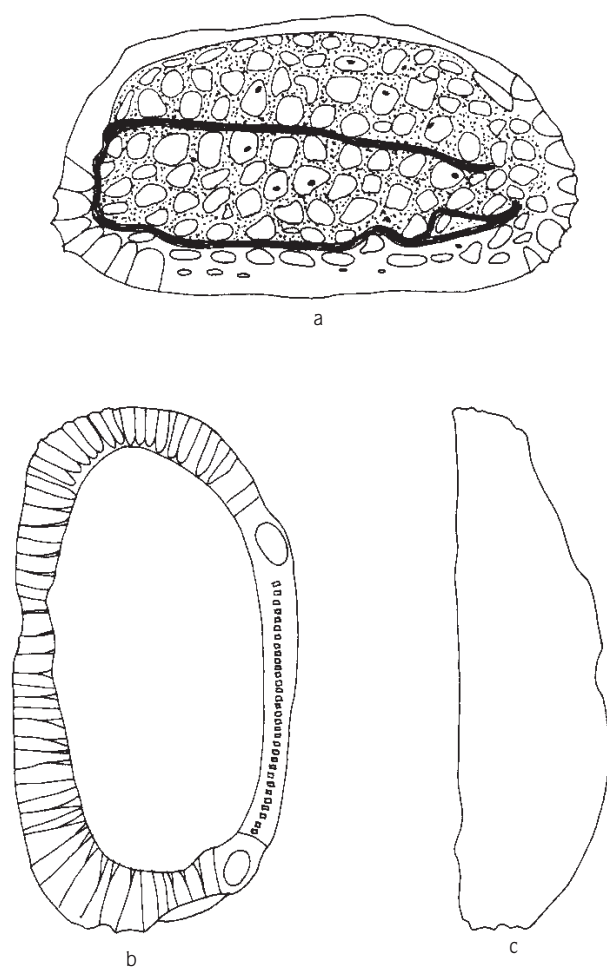


Figure 6. *Cythereis rubra pontica* Dubowsky, 1939
 a) External view of right valve, female 7x10
 b) Internal view of right valve, female 7x10
 c) Dorsal view of left valve, female 7x10

Aurila convexa (Baird 1850) Pokorný, 1955

Material: Station 1, 2 valves; Station 4, 5 valves; Station 5, 8 valves.

Marmara Sea (17), Çandarlı-Dikili (9), Baykent-Kilyos İstanbul (19) are mentioned in some of the previous studies reporting the species. The general distribution includes Paros and Naxos Islands, Greece, Aegean Sea (47); Black Sea, and Azov Sea (23); Romania (24).

A. convexa was found from Iğneada, Şile and the coast at Kerpe. Its known distribution has been extended through the northern parts of Turkey.

Cyprideis torosa (Jones, 1850), Jones 1857

Material: Station 1, numerous; Station 5, 4 valves; Station 6, 2 individuals and 6 valves; Station 28, 1 valve.

Old records of the species from Turkey are İzmir (6); Bergama - İzmir (7); Sarayburnu, Aratepe, Silivri (17); Ayvalık-Bergama (9); Bergama - İzmir (8); Şile, Riva-İstanbul (19); Lake Küçükçekmece-İstanbul (10); Lake Karaboğaz, Bafra (25); Lake Büyükçekmece-İstanbul (13); Köyceğiz Dalyan (20).

The general distribution of the species includes the Baltic Sea, the British Isles, the Netherlands, France, the Azov Sea, Central Asia, North Africa (29); Paros and Naxos Islands, Greece, the Aegean Sea (47); The Baltic Sea, Lake Charkhal and the Aral Sea (30).

C. torosa was encountered at Iğneada, Kerpe, the headwaters of Küçükboğaz creek and the coast at Rize. A broader distribution of this species is already known in Turkey. The species was first named based on the presence of tubercles on the carapaces (51). According to Vesper (51), *C. littoralis* was able to show the relationship between water salinity and tubercle formation, demonstrating that these two species were the same. The tubercles found on the *C. torosa* could allow it to move easily in freshwaters. In this study, finding both types of individuals (with and/or without tubercles) may be an indication of water salinity changes from time to time along the coast of the Black Sea.

Pontocythere bacesei (Caraion, 1960) Caraion 1967

Material: Station 4, numerous; Station 5, numerous; Station 9, 1 individual and 5 valves; Station 15, 1 individual; Station 19, 1 individual and 2 valves; Station 23, 2 valves; Station 28, 2 individuals and 9 valves. New record for Turkey.

The general distribution of the species is limited to a couple of regions around the Romanian coasts (24); the Black Sea and the Azov Sea (23).

P. bacesei was encountered at Şile, Kerpe, Amasra, Samsun, Perşembe, Çavuşlu village, Görele, Eynesil and Rize.

Eucytherura bulgarica Klie, 1937

Material: Station 5, 1 individual; Station 11, 2 individuals; Station 23, 1 individual.

New record for Turkey. Previously, only known from the Romanian coasts (24).

E. bulgarica was found from Kerpe, Yakaören, and Çavuşlu village. It is a new record for Turkey. The known

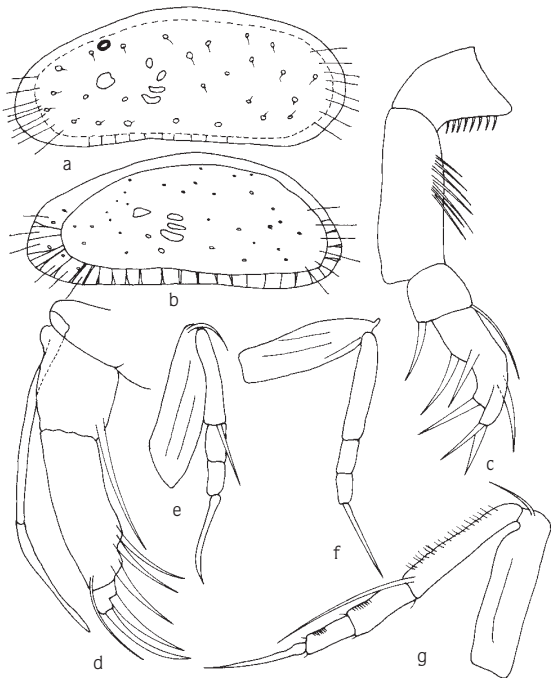


Figure 7. *Pontocythere bacesei* (Caraion, 1960) Caraion 1967
 a) External view of left valve, female 7x10
 b) Internal view of right valve, female 7x10
 c) First antenna, female 7x40
 d) Second antenna, female 7x40
 e) First thoracopod, female 7x40
 f) Second thoracopod, female 7x40
 g) Third thoracopod, female 7x40

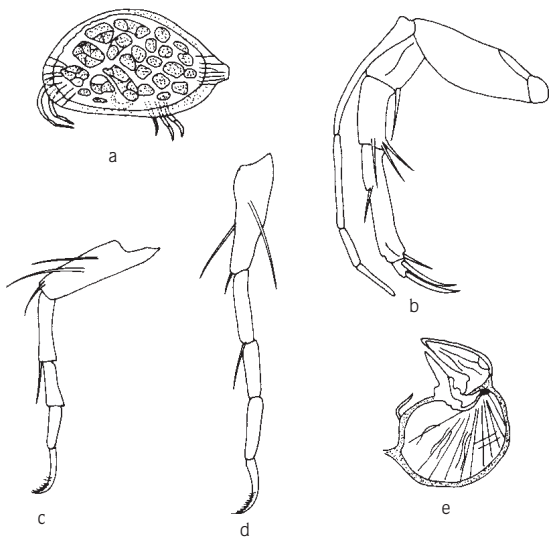


Figure 8. *Eucytherura bulgarica* Klie, 1937
 a) External view of left valve, male 7x10
 b) Second antenna, male 7x40
 c) First thoracopod, male 7x40
 d) Third thoracopod, male 7x40
 e) Reproductive organ 7x40

distribution of the species has been extended through Turkey. It was previously only known from the Romanian Black Sea coast (24).

Microcytherura nigrescens Müller, 1894

Material: Station 11, 4 individuals and 3 valves.

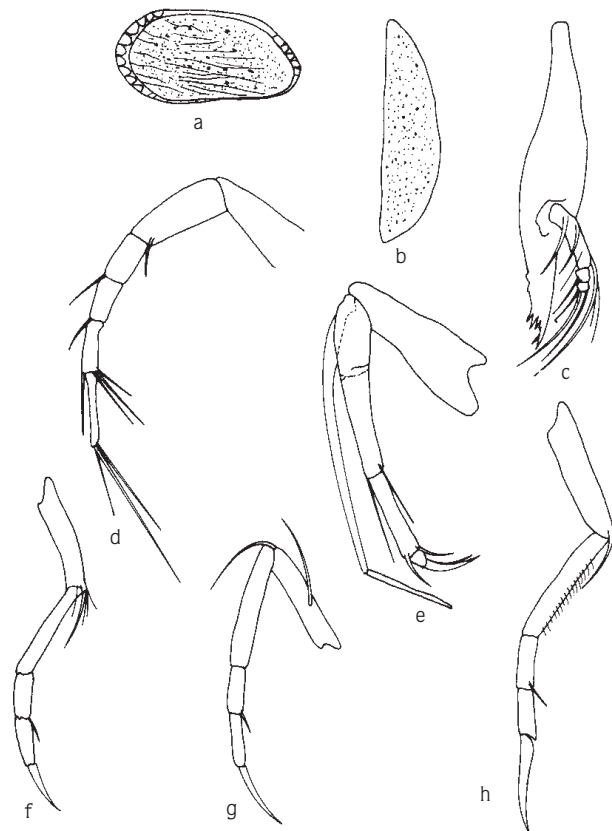


Figure 9. *Microcytherura nigrescens* Müller, 1894
 a) External view of left valve, female 7x10
 b) Dorsal view of right valve, female 7x10
 c) Mandible, female 7x40
 d) First antenna, female 7x40
 e) Second antenna, female 7x40
 f) First thoracopod, female 7x40
 g) Second thoracopod, female 7x40
 h) Third thoracopod, female 7x40

Previous records include the Black Sea and the Azov Sea (23), Naples Bay, Italy, and Europe (50). *M. nigrescens*, found in Yakaören, is also a new record for Turkey. Its distribution extends through Turkey (in this study).

Loxoconcha pontica Klie, 1937

Material: Station 2, 2 individuals; Station 3, 5 individuals and numerous; Station 5, 8 individuals and 3

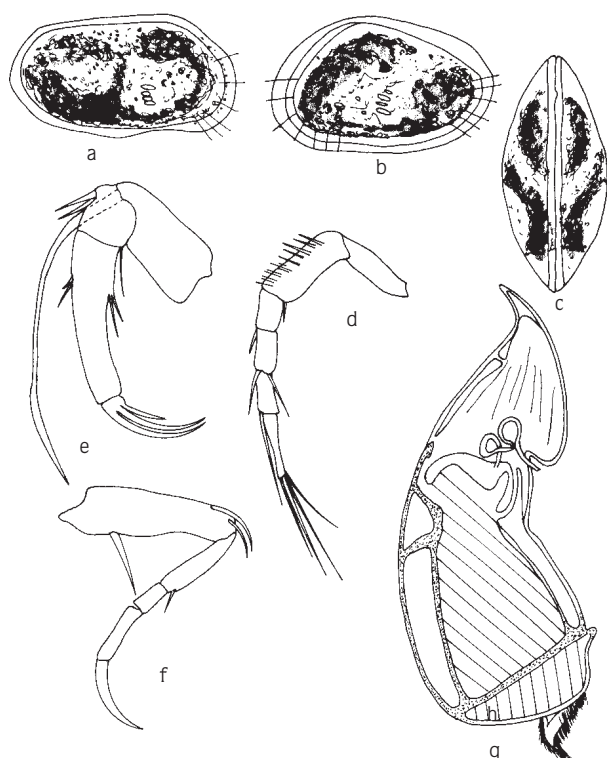


Figure 10. *Loxoconcha pontica* Klie, 1937
 a) External view of right valve, male 6.3x10
 b) Internal view of left valve, female 6.3x10
 c) Female, carapace, dorsal view 6.3x10
 d) First antenna, male 6.3x40
 e) Second antenna, male 6.3x40
 f) Second thoracopod, male 6.3x40
 g) Reproductive organ 6.3x40

valves; Station 14, 2 individuals and 2 valves; Station 18, numerous; Station 19, 1 individual; Station 24, numerous; Station 26, 1 individual and 2 valves; Station 31, numerous; Station 32, numerous; Station 33, 3 individuals and 3 valves; Station 34, 3 individuals and 2 valves.

Previously, the species was known from Black Sea and Azov Sea (23), Karangat, the Mediterranean Sea, the Crimea and the Caucasian coasts, the Bulgarian coast, the Kerch Strait, and the Azov Sea (46). *L. pontica*, a new record for Turkey, was encountered at a total of 12 stations. It was the most abundant species found in the Black Sea (in this study). It seems that *L. pontica* prefers inland seas.

Loxoconcha rhomboidea (Fischer, 1855) Wagner, 1957

Material: Station 4, 4 valves; Station 5, 4 valves; Station 7, 1 individual; Station 11, 2 valves; Station 21,

9 individuals; Station 23, numerous; Station 24, 8 individuals; Station 25, 2 valves; Station 26, 1 valve; Station 27, 1 valve; Station 28, 6 individuals; Station 29, 6 individuals.

In Turkey, this species has been recorded from Marmara Island, Sarayburnu-Istanbul, Marmara Ereğlisi (17); Ayvalık-Bergama (9); İzmit Bay (21); the Aegean Sea (20).

Furthermore, the species has a wide general distribution in the British Isles, the North Sea, the Baltic, the coasts of France, the Mediterranean Sea, Norway, North America (35); Paros and Naxos Islands, Greece, the Aegean Sea (47); the Adriatic Sea (48); Karangat, the Mediterranean Sea, Crimea and the Caucasian coasts, the Bulgarian coast, the Kerç Strait, (46); Evros Delta, the North Aegean Sea-Greece (49).

L. rhomboidea was also one of the most abundant species encountered. It has been reported previously from Turkey. It seems that this species can tolerate changes in water conditions but further research is needed to confirm this. It shows a wide geographical distribution in both brackish waters and marine environments.

Xestoleberis cornelii Caraion, 1963

Material: Station 3, 5 individuals and 4 valves.

Previously, this species was only known from the Soviet Union and Romania (24).

X. cornelii, collected from Rumeli Feneri, is a new record for Turkey.

Xestoleberis aurantia aurantia (Baird, 1838) Sars 1866

Material: Station 4, 5 individuals and 5 valves; Station 20, 1 valve; Station 21, 5 individuals and 2 valves.

Generally this species is known from the Atlantic Ocean, the Mediterranean Sea, the North Sea and the Baltic Sea (24); Karangat, the Mediterranean Sea, Atlantic Ocean, Crimea and the Caucasian coasts, Bulgarian coast, the Kerch Strait, and the Azov Sea (46). This subspecies is a new record for Turkey. *X. aurantia aurantia* was found from Şile, Piraziz and Giresun harbour.

Xestoleberis aurantia acutipenis Caraion, 1963

Material: Station 5, 13 individuals; Station 31, 1 individual and 3 valves.

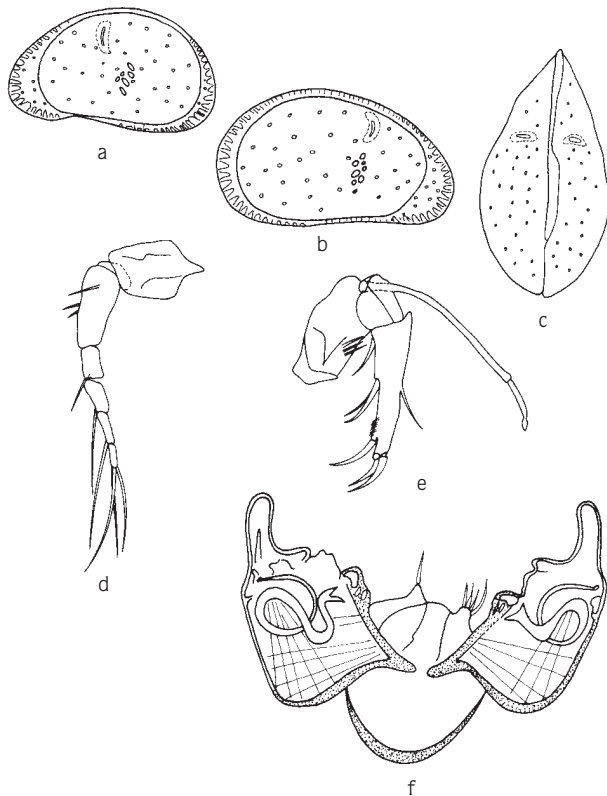


Figure 11. *Xestoleberis cornelii* Caraion, 1963
 a) Left valve, male 7x10
 b) Right valve, female 7x10
 c) Female, carapace, dorsal view 7x10
 d) First antenna, male 5x40
 e) Second antenna, male 5x40
 f) Reproductive organs 5x40

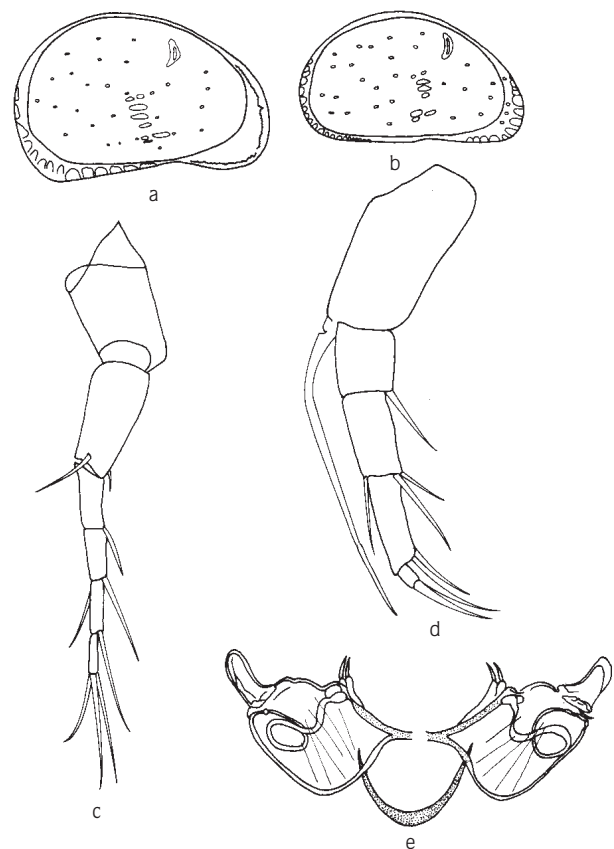


Figure 12. *Xestoleberis aurantia aurantia* (Baird, 1938) Sars 1866
 a) External view of right valve, female 7x10
 b) External view of right valve, male 7x10
 c) First antenna, male 6.3x40
 d) Second antenna, male 6.3x40
 e) Reproductive organs 4x40

The general distribution includes the Black Sea and the Azov Sea (23); Karangat, the Mediterranean Sea, Crimea and the Caucasian coasts, Bulgarian coasts (46). In this study, *X. aurantia acutipenis* was found at Kerpe and Findikli. It is a new record for Turkey. The findings of this species in the study area extended its distribution in Turkey.

***Sclerochilus gewmülleri* Dubowsky, 1939**

Material: Station 7, 2 individuals and 5 valves; Station 19, 1 valve; Station 31, 3 valves.

In general, the species is known from Black Sea, the Adriatic and the Mediterranean Sea (24); the Mediterranean Sea, Crimea and the Caucasian coasts, the North region and the Romanian coasts (46).

S. gewmülleri was found at Akçakoca, Perşembe and Findikli. It is a new record for Turkey.

***Paradoxostoma intermedium* Müller, 1894**

Material: Station 3, 2 valves; Station 5, 1 individual and 1 valve; Station 18, 8 individuals and 1 valve; Station 20, 1 individual and 1 valve; Station 22, 7 individuals and 2 valves.

Generally, the species is known from the Black Sea, the Azov Sea, the Adriatic and the Mediterranean Seas (24); Karangat, the Mediterranean Sea, Crimea and the Caucasian coasts, the Bulgarian coasts, the Romanian coasts, the Kerch strait and the Azov Sea (46).

P. intermedium was encountered at Rumeli Feneri, Bolaman, Piraziz and Giresun. It is a new record for Turkey.



Figure 13. *Xestoleberis aurantia acutipenis* Caraiou, 1963

- a) Right valve, external view of female 7x10
- b) First antenna, male 7x40
- c) Second antenna, male 7x40
- d) Reproductive organs 5x40

Paradoxostoma guttatum Schornikov, 1965

Material: Station 3, 3 individuals; Station 11, 3 valves; Station 19, 1 individual; Station 22, 8 individuals; Station 25, 1 individual and 4 valves; Station 28, 3 valves; Station 29, 1 individual and 1 valve; Station 31, 1 valve; Station 33, numerous.

Previously known from the Black Sea, the Azov Sea (23); Karangat, the Azov Sea, the Black Sea, Crimea and the Caucasian coasts, the Bulgarian coasts, the Northwest region and the Romanian coasts (46).

P. guttatum was found at Rumeli Feneri, Yakaören, Perşembe, Giresun, Akçaabat, Rize, Fındıklı and Hopa. It is a new record for Turkey. According to this study, this species seems to have a broader distribution along the Black Sea coast. In this study, all of the species and subspecies recorded from Black Sea were found within their distribution.

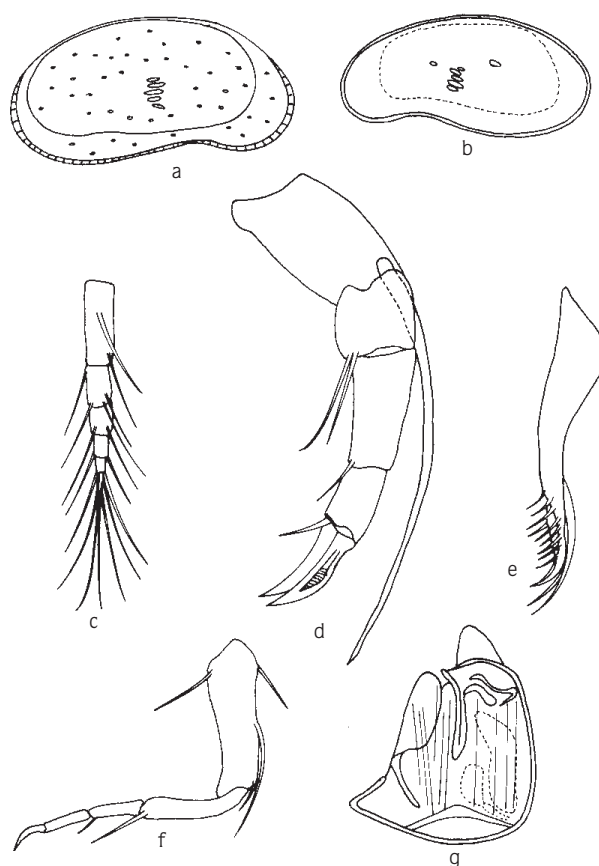


Figure 14. *Sclerochilus gewmülleri* Dubowsky, 1939

- a) External view of right valve, male 7x10
- b) Internal view of right valve, male 7x10
- c) First antenna, male 7x40
- d) Second antenna, male 7x40
- e) Mandibula, male 7x40
- f) Second thoracopod, male 7x40
- g) Reproductive organ 5x40

Discussion

This is the first regionally extensive study on the marine ostracods of the Black Sea coast of Turkey. During the present study, freshwater, brackish, and marine ostracods were determined at the study sites. Freshwater and brackish water ostracods were mostly abundant where the flowing freshwaters meet the Black Sea. The study sites exhibit different characteristics of fresh and brackish waters, and the patterns of seawater. Under such conditions, 24 species and three subspecies were identified from 34 stations, among which, 12 species and three subspecies are new records for the aquatic environments of Turkey. Recording these species and subspecies from the study area extended their general distribution. Such a conclusion apparently brings

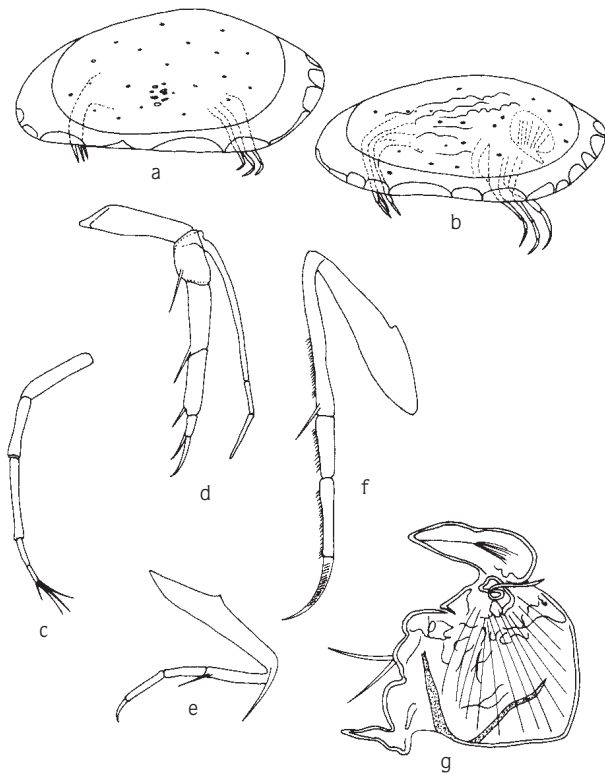


Figure 15. *Paradoxostoma intermedium* Müller, 1894
 a) Left valve, female 7x10
 b) Left valve, male 7x10
 c) First antenna, male 5x40
 d) Second antenna, male 5x40
 e) First thoracopod, male 5x40
 f) Third thoracopod, male 5x40
 g) Reproductive organ 5x40

a different perspective to how marine ostracods are dispersed over long distances. Basically two dispersion (passive and active) mechanisms are known for the freshwater ostracods and the passive way is known to be the most common way in freshwaters. However, it is questionable whether passive dispersion is more common in marine ostracods. Further studies are needed in order to answer such a question.

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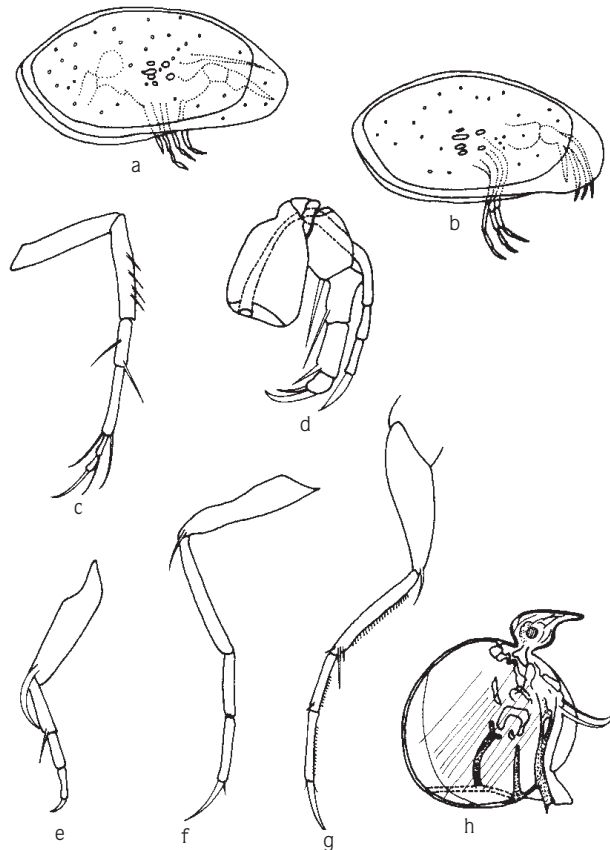


Figure 16. *Paradoxostoma guttatum* Schornikov, 1965
 a) Right valve, female 7x10
 b) Right valve, male 7x10
 c) First antenna, male 5x40
 d) Second antenna, male 5x40
 e) First thoracopod, male 5x40
 f) Second thoracopod, male 5x40
 g) Third thoracopod, male 5x40
 h) Reproductive organ 5x40.

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