Turkish J. Marine Sciences 6(1):87-102 (2000)

The Ostracods Species Collected From Coasts Of The Gökçeada (Imbroz) Island (Aegean Sea)

Gökçeada (Imroz) adasının (Ege Denizi) kıyılarından toplanan ostrakod türleri

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Abstract

In this study, material was collected from coasts of Gökçeada Island on 26 and 27 July 1997. The materials collected from 7 stations were evaluated, 10 species and 1 subspecies (*Eucypris inflata, Callistocythere mediterranea, Aurila prasina, Cyprideis torosa, Eucytherura bulgarica, Loxoconcha pontica, Loxoconcha rhomboidea, Loxoconcha tumida, Xestoleberis corneli, Xestoleberis aurantia acutipenis, Paradoxostoma intermedium*) belonging to 8 genera were determined.

Keywords: Gökçeada, Aegean Sea, Ostracods species, Fauna

Introduction

The Gökçeada island, which is located in Aegean Sea (25° 39'95''E and 26° 01'00''E-46° 05'45''N and 46° 14'45''N), is the largest island (855.5 km²) of Turkey.

Ostracods are generally benthic invertebrate animals that live on or among the mud, sand or detritus substrata. Because each species has its own habitat preferences, they are often used as indicator forms of such habitats. Thus, the absence, presence and distribution of certain species can reveal important quantitative and qualitative data regarding the particular aquatic environment which they prefer. However, describing such data requires full knowledge of this species taxonomy, distribution and their biology.

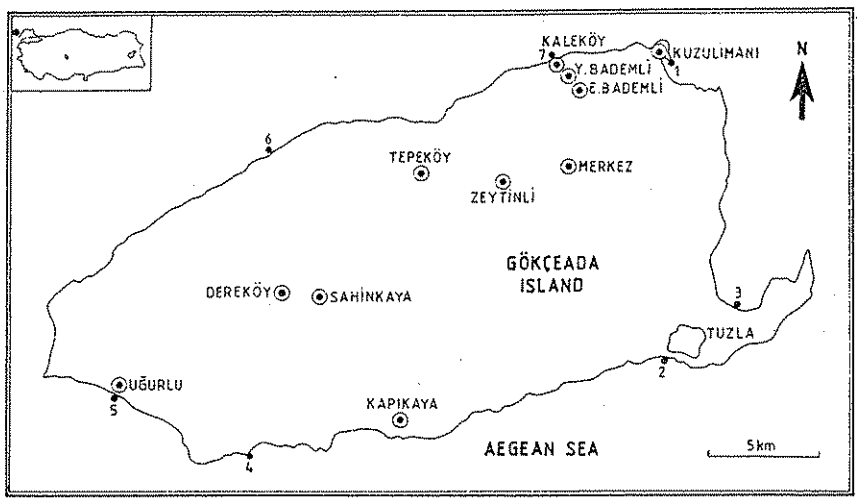

Figure 1. Sampling stations

Some studies have been performed to determine the marine ostracod fauna of Turkey. The studies include Kubanç (1989) in the Sea of Marmara, Gülen *et al.*, (1990) in Bosphorus-Istanbul, Kılıç (1992) in Black Sea entrance-Istanbul, KALELİ (1993) in Karaboğaz Lagoon lake, Kubanç (1995) in Aegean Sea, Gülen *et al.*, (1995) in Gulf of İzmit and Kılıç (1997) in Black Sea. All these ostracods found from the coasts of Gökçeada Island are new for these localities. Seven stations are shown in figure 1.

Material and Methods

This study has been performed in summer in coasts of Gökçeada Island. The material was collected with Müller's plankton net from seven stations (figure 1). Marine and brackish ostracods are found from stagnant shallow waters of beach, lagoon, harbour and Salt Lake. In order to collect the living forms in the mud and sand, the deep sample container (Bottom sample vessel=Bager) and special sieves were used. The fixation of the material collected was made in 4 % formaldehyde after washing the material under the pressurised water, ostracods were separated from mud and detritus, and species identification was based on the morphological characters of carapace and extremities. They were conserved in 70 % alcohol and glycerine (proportion 1:1).
Temporary slides were made in lactaphenol and the permanents were made in Canadian balsam. Dry slides of carapaces were also made in micropaleontological slides, consisting of carapaces.

Besides, some of major physical parameters were recorded in each station such as salinity and dissolved oxygen. Salinity values were measured by Mohr-Knudsen method, while dissolved oxygen values were determined by Winkler method. Sampling stations and their major parameters are shown in table 1.
All the materials are kept in the Zoology Museum of the Faculty of Science, University of Istanbul.

Table 1: Sampling stations and their major parameters.

Station number	Name of stations	Date	Co-ordinates N/E	Salinity ‰ S	Temperature °C	Dissolved Oxygen (mg l^{-1})
1	Kuzu Harbour	26.07.97	25°56'83''E 40°13'80''N	34	23	3.3
2	Salt lake	26.07.97	25°57'57''E 40°07'42''N	33.7	23	5.0
3	Seacoast of Tuzla	26.07.97	25°58'81''E 40°08'62''N	33.9	23	5.1
4	Seacoast of Yuvalı	26.07.97	25°45'36''E 40°10'82''N	34.2	23	5.4
5	Uğurlu Harbour	27.07.97	25°42'32''E 40°07'00''N	33.7	23	5.3
6	Seacoast of Marmoros	27.07.97	25°45'00''E 40°11'71''N	34	23	5.3
7	Seacoasts of Kaleköy	27.07.97	25°54'20''E 40°14'23''N	33.8	23	5.2

Findings and Taxonomy

The classification made by HARTMANN and PURI (1974) has been followed in this work.

Class : Crustacea
Subclass : Ostracoda Lattreille, 1806
Order : Podocopida G. W. Müller, 1894
Suborder : Podocopa Sars, 1866
Superfamily : Cypridacea Baird, 1845
Family : Cyprididae Baird, 1845
Subfamily : Eucypridinae Bronstein 1947

Genus : *Eucypris* (Vavra, 1891) Daday, 1900

Eucypris inflata (Sars, 1903) Bronstein, 1925
Material: Station 2, 26.07.1997, Numerous ♀♀ and ♂♂.
Previous Records from Turkey: Antalya and Mersin (Gülen, 1985b and 1988);Izmir (Altınsaçlı, 1988) and Istanbul (Altınsaçlı and Yılmam, 1995).
Known Distribution: NorthAfrica, Kazakhistan, Caspian Sea, Georgian coasts of Black Sea and Sea of Azov (Bronstein, 1947).
Subfamily : Cytherecea Baird, 1850
Family : Leptocytheridae Hanai, 1957
Genus : *Callistocythere* Ruggieri, 1953
Callistocythere mediterranea (G.W. Müller, 1894) Morkhoven, 1963
Material: Station 7, 27.07.1997, 3 ♀♀ and 1 ♂.
Previous Records from Turkey : Eynesil, Beşikdüzü, Fındıklı coasts of Black Sea (Kılıç, 1997).
Known Distribution: Black Sea and Sea of Azov (Schornikov, 1969); Karangatian periods, Mediterranean Sea, Crimea coasts of Black Sea, Caucasian coasts of Black Sea, Bulgarian coasts of Black Sea and Romanian coasts of Black Sea (Waack, 1981).
Family : Hemicytheridae Puri, 1953
Subfamily : Hemicythereninae Puri, 1953

Genus : *Aurila* Pokorny, 1955
Aurila prasina Barbeito-Gonzales, 1971,
Material: Station 4, 26.07.1997, 3 ♀♀ and 2 ♂♂; Station 7, 27.07.1997, 5 ♀♀ and 1 ♂.
Previous Records from Turkey: Ayvalık (Kubanç and Altınsaçlı, 1990); Riva Coasts of Black Sea (Kılıç, 1992).
Known Distribution : Paros and Naxos Island, Aegean Sea, (Barbeito-Gonzales, 1971) and Adriatic Sea (Bonaduce *et al.*, 1975).
Family : Cytherideidae Sars, 1925
Subfamily : Cytherideinae Sars, 1925

Genus : *Cyprideis* Jones, 1857

Cyprideis torosa (Jones, 1850), Jones 1857
Material: Station 2, 26.07.1997, Numerous ♀♀ and ♂♂.
Previous Records from Turkey: İzmir (Gülen, 1985a); İzmir (Altınsaçlı, 1988); Sea of Marmara (Kubanç, 1989); İzmir and Balıkesir (Kubanç and Altınsaçlı, 1990); Istanbul (Kılıç, 1992); Istanbul (Külköylüoğlu *et al.*, 1993); Sinop (Kaleli, 1993); Istanbul (Külköylüoğlu *et al.*, 1995); Aegean Sea (Kubanç, 1995) and İğneada, Kerpe Beach, Rize coasts of Black Sea (Kılıç 1997).
Known distribution: Baltic Sea, British Isles, Netherlands, France, Sea of Azov, Central, East and North Africa (Klie, 1938); Baltic Sea and Lake Aral (Bronstein, 1947); Paros and Naxos Islands and Aegean Sea (Barbeito-Gonzales 1971).
Family : Cytheruridae G.W. Müller, 1894
Subfamily : Cytherurinae G.W. Müller, 1894
Genus : *Eucytherura* G.W. Müller, 1894
Eucytherura bulgarica Klie, 1937
Material : Station 3, 26.07.1997, 2 ♀♀ and 2 ♂♂; Station 5, 27.07.1997, 2 ♀♀ and 4 ♂♂ ; Station 6, 27.07.1997, Numerous ♀♀ and ♂♂.
Previous Records from Turkey: Kerpe Beach, Yakaören coasts, Çavuşlu village coasts of Black Sea (Kılıç, 1997).
Known Distribution: Romanian coasts of Black Sea (Caraion, 1967).
Family : Loxoconchidae Sars, 1925.

Genus : *Loxoconcha* Sars, 1866
Loxoconcha pontica Klie, 1937
Material : Station 7, 27.07.1997, Numerous ♀♀ and ♂♂.
Previous Records from Turkey : Samsun Harbour, Kerpe Beach, Hopa Harbour, Rumeli Feneri coasts, Bolaman coasts, Perşembe coasts, Beşikdüzü coasts, Arsin coasts, Fındıklı coasts, Arhavi coasts and Kemalpaşa coasts of Black Sea (Kılıç, 1997).

Known Distribution: Black Sea and Sea of Azov (Schornikov, 1969); Karangatian period, Mediterranean Sea, Crimea and Caucasian coasts of Black Sea, Bulgarian coast of Black Sea, Kerch Strait and Sea of Azov (Waack, 1981).

Loxoconcha rhomboidea (Fischer, 1855) Wagner, 1957

Material: Station 4, 26.07.1997, Numerous ♀♀ and ♂♂.

Previous Records from Turkey: Sea of Marmara (Kubanç, 1989); Ayvalık coasts of Aegean Sea (Kubanç & Altınsaçlı, 1990); Gulf of İzmit (Gülen *et al.*, 1995); Aegean Sea (Kubanç, 1995); Giresun Harbour, Kerpe Beach, Şile coasts, Akçakoca coasts, Yakaören coasts, Görele coasts, Çavuşlu village coasts, Beşikdüzü coasts, Akçaabat coasts, Arsin coasts and Rize coasts of Black Sea (Kılıç, 1997).

Known Distribution : British Isles, North Sea, Baltic Sea, coasts of France, Mediterranean Sea, coasts of Norwegian Sea, North America coasts (Sars, 1928); Paros and Naxos Islands, Greece coasts of Aegean Sea (Barbeito-Gonzales, 1971); Adriatic Sea (Bonaduce *et al.*, 1975) ; Karangatian periods, Mediterranean Sea, Crimea coasts of Black Sea, Caucasian coasts of Black Sea, Bulgarian coasts of Black Sea, Kerch Strait (Waack, 1981); Evros Delta, North Aegean Sea Greece (Stambolidis, 1985).

Loxoconcha tumida Chapman, 1902

Material : Station 5, 27.07.1997, 3 **OO**; Station 7, 27.07.1997, Numerous ♀♀ and ♂♂.

Previous Records from Turkey: Aegean Sea (Kubanç, 1995).

Known Distribution : Adriatic Sea (Bonaduce *et al.*, 1975).

Family : Xestoleberididae Sars, 1928.

Genus : *Xestoleberis* Sars, 1866

Xestoleberis cornelii Caraion, 1963

Material: Station 4, 26.07.1997, 3 ♀♀ and 3 ♂♂; Station 5, 27.07.1997, 4 ♀♀ and 6 ♂♂.

Previous Records from Turkey: Rumeli Feneri coasts of Black Sea (Kılıç, 1997).

Known Distribution: Soviet Union and Romanian coasts of Black Sea (Caraion, 1967).

Xestoleberis aurantia acutipenis Caraion, 1963

Material: Station 1, 26.07.1997, 5 ♀♀ and 3 ♂♂; Station 2, 26.07.1997, 1 ♂; Station 5, 27.07.1997, numerous ♀♀ and ♂♂; Station 6, 27.07.1997, 4 ♀♀ and 3 ♂♂.

Previous Records from Turkey: Kerpe coasts and Fındıklı coasts of Black Sea (Kılıç, 1997).

Known Distribution: Black Sea and Sea of Azov (Schornikov, 1969); Karangat, Mediterranean Sea, Crimea and Caucasian coasts of Black Sea and Bulgarian coasts of Black Sea (Waack, 1981).

Family : Paradoxostomatidae Brady & Norman, 1889

Genus : *Paradoxostoma* Fisher, 1855

Paradoxostoma intermedium Müller, 1894

Material: Station 1, 26.07.1997, 2 ♀♀; Station 5, 27.07.1997, Numerous ♀♀ and ♂♂; Station 6, 27.07.1997, 6 ♀♀ and 4 ♂♂; Station 7, 27.07.1997, 2 ♀♀ and 2 ♂♂.

Previous Records from Turkey: Kerpe Beach, Giresun Harbour, Rumeli Feneri coasts, Fatsa coasts, and Piraziz coasts of Black Sea (Kılıç, 1997).

Known Distribution: Black Sea, Sea of Azov, Mediterranean Sea and Adriatic Sea (Caraion, 1967); Karangatian period, Mediterranean Sea, Crimea and Caucasian coasts of Black Sea, Bulgarian coasts of Black Sea, Romanian coasts of Black Sea, Kerch Strait and Sea of Azov (Waack, 1981).

Results and Discussion

Our target in this study was to determine the living ostracod species in the coasts of Gökçeada Island (Aegean Sea), and to account the biological riches of ostracods in Turkey.

A single species belonging to genus *Eucypris* was determined in this island. *Eucypris inflata* known as originated from west and central Asia came to the Anatolia during glacial era. Up to now, the species has been reported from some other localities in Turkey; Antalya and Mersin (Gülen, 1985b and 1988), Bergama-İzmir (Altınsaçlı, 1988) and Lake Terkos (Altınsaçlı & Yılmam, 1995). This species exists in lagoons of the Thrace region (Altınsaçlı & Yılmam, 1995) and the coasts of the Aegean Region (Altınsaçlı, 1988). The existence of bisexual population of this species has been first reported by Altınsaçlı (1988) in Turkey. Bronstein (1947) determined the bisexual populations of this species in brackish water of former Soviet Union. According to Bronstein (1947), this species was also known in northern Africa. Our finding of the species coincides with these earlier reports. Possibly, the species might have entered to the Black Sea and passed through Anatolia, and finally came to Gökçeada Island by means of passive ways. Existence of an intense population of this species that is resistant to very salty waters, was also an expected result in the island.

One species of the genus *Callistocythere* was identified. *Callistocythere mediterranea* was encountered in Çavuşlu village coasts, Beşikdüzü and Fındıklı coasts of Black Sea by Kılıç (1997). This species is a second record for Turkey. The known distribution of the species includes the Black Sea, Sea of Azov (Schornikov, 1969); Mediterranean Sea, coasts of Crimea Peninsula, Caucasian coasts, Bulgarian coasts and Romanian coasts of Black Sea (Waack, 1981). This species has Mediterranean origin and is a new record for the Aegean Sea reported in this study.

Aurila prassina was found in İğneada coasts. Previously, this species was recorded from Ayvalık coasts of Aegean Sea (Kubanç and Altınsaçlı, 1990) and Riva coasts of Black Sea (Kılıç, 1992). Its distribution has been extended through the northern parts of Turkey with this study. It is also known from Paros and Naxos Islands

coasts of Aegean Sea (Barbeito-Gonzales, 1971) and Adriatic Sea (Bonaduce *et al.*, 1975).

One species belonging to the genus *Cyprideis* was determined in Gökçeada Coasts. General distribution of *Cyprideis torosa* includes the Baltic Sea, British Isles, Netherlands, France, Sea of Azov, Central Asia, North Africa (Klie, 1938); Paros and Naxos Islands, Greece-Aegean Sea (Barbeito-Gonzales, 1971); Baltic Sea, and the lakes Charkhal and Aral (Bronstein, 1947). A broader distribution of species is already known in Turkey. The species was first named as based on the presence of tuberculus on the carapaces (Vesper, 1972). According to VESPER (1972), *Cyprideis littoralis* was able to show the relationship between water salinity and tubercule formation, demonstrating that these two species were the same. The tubercules found on the *Cyprideis torosa* could make it easy to move in freshwaters. This species was reported by Gülen (1985); Altınsaçlı and Kubanç (1990); Külköylüoğlu *et al.*, (1993 and 1995) ; Kubanç (1989 and 1995); Kaleli (1993) and Kılıç (1992 and 1997) in Turkey. *Cyprideis torosa* is a species that prefers salty sea waters, lagoons, brackish waters and inland salty waters as its living habitat.

A single species was found belonging to the genus *Eucytherura*. *Eucytherura bulgarica* was found in Gökçeada coasts. This species has been reported in Kerpe Beach, Yakaören and Çavuşlu village coasts of Black Sea by Kılıç (1997). This species is a second record for Turkey. The known distribution of the species has been extended through Turkey, but it is also known from the Romanian coasts of Black Sea (Caraion, 1967).

Three species belonging to the genus *Loxoconcha* were found and identified. *Loxoconcha pontica* is a second record for Turkey. This species is a new record for Aegean Sea. This species has been reported in Kilyos and Rumeli Feneri coasts of Black Sea, Kerpe Beach, Samsun Harbour, Bolaman, Perşembe, Arsin, Beşikdüzü, Fındıklı and Arhavi coasts of Black Sea, Hopa Harbour and Kemalpaşa coasts of Black Sea by Kılıç (1997). One can

tell that it was the most abundant species found in the Black Sea. The general distribution of the species includes the Black Sea and Sea of Azov (Schornikov, 1969), the Mediterranean Sea, Crimea peninsula coasts of Black Sea, Caucasian coasts of Black Sea, Bulgarian coasts of Black Sea, the Kerch Strait and Sea of Azov (Waack, 1981). It seems that *Loxoconcha pontica* can be found from barckish inland waters.

The second species of the genus *Loxoconcha* was found. *Loxoconcha rhomboidea* was also one of the most abundant species encountered during this study. *L. rhomboidea* has been previously known in Turkey (Kubanç, 1989; Kubanç and Altınsaçlı, 1990 and Kılıç, 1997). Based on its general distribution, one can tell that this species can bear to the physical changes in water conditions. Its general distribution includes the British Isles, the North Sea, Baltic Sea, the coasts of France, the Mediterranean Sea, Norway, North America (Sars, 1928); Paros and Naxos Islands, Greece, the Aegean Sea (Barbeito-Gonzales, 1971); The Adriatic Sea (Bonaduce *et al.*, 1975); the Mediterranean Sea, Crimea coasts of Black Sea, Caucasian coasts of Black Sea, Bulgarian coasts of Black Sea, the Kerch Strait (Waack, 1981); Evros Delta, the North Aegean Sea-Greece (Stambolidis, 1985). The species shows a wide distribution in both brackish and sea waters.

Other *Loxoconcha* species *Loxoconcha tumida* is the third species was found from the coasts of Gökçeada Island. Its general distribution includes Adriatic Sea (Bonaduce *et. al.*, 1975). Kubanç (1995) has been reported this species in Aegean Sea.

One species and subspecies of the genus *Xestoleberis* was encountered. *Xestoleberis cornelii* has been reported from Rumeli Feneri and of the coasts Black Sea by Kılıç (1997) This is a second record for Ostracoda fauna of Turkey. The general distribution of the species includes the coasts of the former Soviet Union and Romanian coasts of Black Sea (Caraion, 1967).

Subspecies *Xestoleberis aurantia acutipenis* was described from Kerpe and Fındıklı coasts of Black Sea by Kılıç (1997). This is a second record for Ostracoda fauna of Turkey. This species is known from The Black Sea and Sea of Azov (Schornikov, 1969); the Mediterranean Sea, coasts of Crimea Peninsula, Caucasian coasts and Bulgarian coasts of Black Sea (Waack, 1981). Encountering the species in the Black Sea extended its distribution in Turkey, but the species was found within its known distribution.

One species of the genus *Paradoxostoma* was collected. *Paradoxostoma intermedium* was encountered from Rumeli Feneri, Bolaman, Piraziz and the Giresun coasts of Black Sea by Kılıç (1997). This is a second record for marine Ostracoda fauna of Turkey. The general distribution includes the Black Sea, Sea of Azov, Adriatic Sea and the Mediterranean Sea (Caraion, 1967); Karangat, Mediterranean Sea, Crimea coasts, Caucasian coasts Bulgarian coasts, and Rumanian coasts of Black Sea, the Kerch strait and Sea of Azov (Waack, 1981).

Finally, all of the species and subspecies recorded from coasts of Gökçeada Island were found within their distribution.

Özet:

Bu çalışmada, materyal 26 ve 27 Temmuz 1997 tarihlerininde Gökçeada nın kıyılarından toplanmıştır. 7 istayondan toplanan materyal değerlendirilmiş 8 cinse ait 10 tür ve bir alltür (*Eucypris inflata, Callistocythere mediterranea, Aurila prasina, Cyprideis torosa, Eucytherura bulgarica, Loxoconcha pontica, Loxoconcha rhomboidea, Loxoconcha tumida, Xestoleberis corneli, Xestoleberis aurantia acutipenis, Paradoxostoma intermedium*) saptanmıştır.

Acknowledgments

We are very thankful to Dr. Okan Külköylüoğlu for his help.

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Received: 27.07.1999

Accepted: 06.12.1999