

Contribution to the Knowledge of the Free-Living Isopods of the Aegean Sea Coast of Turkey

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Received: 29.07.2005

Abstract: This research was carried out along the Turkish Aegean Sea coast (from Saros Bay in the north to Turunç-Marmaris in the south) in order to determine the Isopod fauna. A total of 163 samplings were conducted at 23 stations and 17 different biotopes, from which 3209 specimens were collected belonging to 18 families, 29 genera and 50 species.

Among the species determined, 18 are new records for the Turkish fauna (*Anthura gracilis*, *Apanthura corsica*, *Asellus aquaticus*, *Janiropsis breviremis*, *Uromunna petiti*, *Cirolana cranchii*, *Eurydice affinis*, *E. inermis*, *E. pulchra*, *Cymodoce hanseni*, *Dynamene bifida*, *Ischyromene lacazei*, *Lekanesphaera monodi*, *Sphaeroma pulchellum*, *Emetha audouinii*, *Rocinela dumerillii*, *Astacilla longicornis*, and *Halophiloscia couchi*), and 20 are new for the Turkish Aegean Sea coast (by the addition of *I. metallica* and *S. walkeri* to the above list).

Key Words: Isopoda, Crustacea, taxonomy, Aegean Sea, Turkey

Türkiye'nin Ege Denizi Kıyılarının Serbest Yaşamlı Isopod Faunasına Katkıları

Özet: Bu çalışma Türkiye'nin Ege Denizi kıyılarının (Kuzeyde Saros Körfezi'nden Güneyde Turunç-Marmaris'e kadar) Isopod faunasını belirlemek amacıyla gerçekleştirilmiştir. 17 farklı biyotop ve 23 istasyonda gerçekleştirilen 163 örneklemede 3209 birey elde edilmiş ve 18 familya 29 genus ve 50 tür tespit edilmiştir.

Belirlenen türler arasında 18 tür (*Anthura gracilis*, *Apanthura corsica*, *Asellus aquaticus*, *Janiropsis breviremis*, *Uromunna petiti*, *Cirolana cranchii*, *Eurydice affinis*, *E. inermis*, *E. pulchra*, *Cymodoce hanseni*, *Dynamene bifida*, *Ischyromene lacazei*, *Lekanesphaera monodi*, *Sphaeroma pulchellum*, *Emetha audouinii*, *Rocinela dumerillii*, *Astacilla longicornis*, *Halophiloscia couchi*) Türkiye faunası için ve 20 tür de (*I. metallica* ve *S. walkeri*'nin listeye eklenmesiyle) Türkiye'nin Ege Denizi kıyıları için yeni kayıttır.

Anahtar Sözcükler: Isopoda, Crustacea, taksonomi, Ege Denizi, Türkiye

Introduction

The first studies on the isopods of Turkish seas were carried out by Colombo (1885), Sowinsky (1898), Collinge (1916) and Monod (1931), followed by Demir (1952), Geldiay and Kocataş (1972), Kühne (1972), Kocataş (1976) and Veuille and Kocataş (1978, 1979).

Guerin (1832) was the first to report isopods from the Aegean Sea. Several isopod species were included in the fauna by additional studies (Stephensen, 1915; Kiseleva, 1963; Jones, 1969; Schmalfuss, 1974, 1975,

1976, 1982; Papoutsoglou, 1976; Dounas and Koukouras, 1986).

Inventory studies on isopods were also carried out in the Dardanelles, Sea of Marmara and the Bosphorus (Ostroumoff, 1896; Sowinsky, 1898; Collinge, 1916), and the Black Sea coast of Russia (Birstein, 1951; Pauli, 1954; Kussakin, 1969; Kussakin and Maljutina, 1989).

Along the eastern Mediterranean coastline, including Turkey, several studies have been performed (Omer-Cooper, 1924; Monod, 1931, 1932; Larwood, 1940;

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Larwood, 1954; Masry, 1970; Glynn, 1972; Pretzmann, 1975; Paperna and Por, 1976; Botosaneanu and Notenboom, 1992).

Isopods of the central and western Mediterranean are well documented, and information on the systematics, biology and ecology of benthic, benthoplanktonic and parasitic isopods is available (Stock, 1959; Lemercier, 1960; Ledoyer, 1968; Bellan-Santini, 1969; Macquart-Moulin, 1969; Schultz, 1969; Roman, 1970; Menzies, 1972; Charmantier, 1974; Prunus and Pantoustier, 1976; Rezig, 1977; Cals, 1978; Veuille, 1979; Kaim-Malka, 1980; Wagele, 1981; 1982; Bourdon, 1982; Riedl, 1983; Müller, 1989; Brand and Wagele, 1991; Guarino et al., 1993; Abello and Frankland, 1997).

The aim of the present study was to identify the isopod species of the Turkish Aegean coast, and to provide new data that would be useful in the process of

characterizing the isopod fauna of the entire Turkish seas.

Materials and Methods

The study was conducted between 1992 and 1997, in order to determine the isopod species distributed along the Turkish Aegean Sea coast. For this purpose, a total of 163 samplings were carried out at 23 stations located between Saros Bay in the north and Marmaris in the south (Figure, Table 1). Samplings were performed in both the benthic zone and the pelagic zone.

Benthic samplings

Coastal samplings were performed either by hand collection or by skin diving at the supralittoral, mediolittoral and upper infralittoral zones at depths of 0

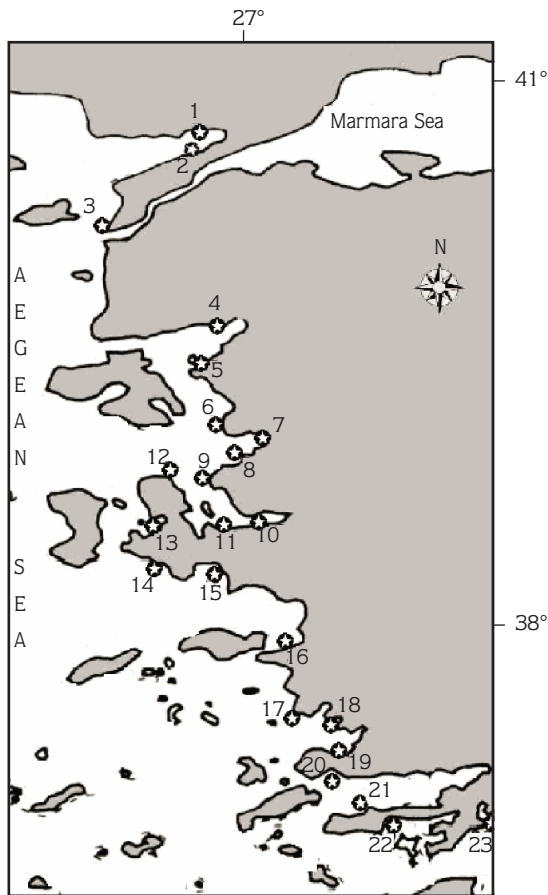


Figure. Map of the Aegean Sea, indicating the sampling stations.

Table 1. Station details (Location, Date).

Station No.	Location	Date
1	Sazlıdere (Saros bay)	22.07.1996
2	Güneyli (Saros bay)	05.07.1995
3	Çanakkale Monument	05.07.1995
4	Altınoluk (Edremit bay)	06.07.1995
5	Cunda Island (Ayvalık)	06.07.1995
6	Dikili	07.07.1995
7	Şakran	07.07.1995
8	Foça	08.05.1996
9	Eski Foça	07.07.1995
10	İnciraltı (İzmir bay)	22.06.1995
11	Urla-Karantina Island (İzmir bay)	14.06.1995
12	Yeni port (Karaburun)	09.05.1996
13	Ildır (Çeşme)	20.09.1995
14	Alaçatı (Çeşme)	20.09.1995
15	Siğacık (Seferihisar)	22.06.1995
16	Kuşadası	23.07.1995
17	Akbük (Didim)	23.07.1995
18	Güllük (Bodrum)	22.07.1995
19	Torba (Bodrum)	22.07.1995
20	Bodrum	22.07.1995
21	Körmen port (Datça)	20.07.1995
22	Datça	20.07.1995
23	Turuç (Marmaris)	21.07.1995

to 5 m. Randomly collected stones (both bare and algae covered) were scraped with a spatula, then washed using 1%-2% formalin with sea water in a plastic washbasin and sieved through a mesh (0.5 mm in size). The same procedure was performed for quadrat samplings (20 x 20 cm) from algae and phanerogame covered substratum. Samples from the sandy bottoms were collected by a plastic pipe 15 cm in diameter and sieved through the same mesh. Some isopods were collected by bare hand from *Pinna nobilis* (Bivalvia), *Sarcotragus* cf. *muscarum* and *Verongia aerophoba* (Porifera), which were encountered at certain stations.

Offshore samplings were carried out on board the research vessels K. Piri Reis, Egesüf and Hippocampus. Samplings from soft substrates were made either by dredge or van Veen grab. All material collected was fixed in 5% formalin. The fish specimens caught during trawling by the research vessels were also examined and parasitic isopods were collected from the mouth, gill opening or skin of fishes.

Pelagic samplings

Pelagic samples were mostly obtained from horizontal plankton hauls during the night. A light source was also used to attract isopods, which were collected by a scoop made of a plankton net.

The material obtained from benthic and pelagic samplings was sorted and analyzed in the laboratory. Body extremities essential for species identification and drawings were dissected. Drawings were created using an Olympus microscope and a camera lucida mounted on a stereomicroscope.

Results

Taxonomic findings

The classification used in this study follows Grüner (1965), and ERMS (2005) for species names. According to the examination of 59 species among orders, 1 species belongs to Gnathiidea, 28 to Flabellifera, 6 to Valvifera, 11 to Asellota and 4 to Oniscoidea. Among all the species determined, 18 (*) are recorded for the first time from Turkey, and 20 species (with the addition of *Sphaeroma walkeri* and *Idotea metallica*) for the first time from the Turkish Aegean Sea coast.

ANTHURIDEA

FAM: ANTHURIDAE

Anthura gracilis (Montagu, 1808)*

Material: 4 ♀♀; sta. 16 (1 ♀; 3 m), sta. 17 (1 ♀; 4 m), sta. 20 (2 ♀♀; 1 m).

The species is known from the Mediterranean (Monod, 1923; Perrier, 1930; Neogescu, 1980; Wagele, 1980), but is hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Apanthura corsica Amar, 1953*

Material: 1 ♀; sta. 22 (1 ♀; 3-4 m)

The species is reported from various parts of the Mediterranean (Amar, 1953; Neogescu, 1980; Wagele, 1980), but is hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Cyathura carinata (Kroyer, 1847)

Material: 4 ♀♀; sta. 16 (2 ♀♀; 1 m), sta. 23 (2 ♀♀; 0.5 m)

FAM: PARANTHURIDAE

Paranthura costana Bate & Westwood, 1868

Material: 25 ♂♂, 27 ♀♀; sta. 2 (1 ♂, 1 ♀; 1-2 m), sta. 3 (3 ♂♂, 4 ♀♀; 0.5-1 m), sta. 5 (2 ♂♂, 3 ♀♀; 0.5-1 m), sta. 9 (2 ♂♂, 4 ♀♀; 0.5-1 m), sta. 11 (1 ♂, 3 ♀♀; 0.5-1 m), sta. 15 (7 ♂♂, 7 ♀♀; 1-5 m), sta. 17 (1 ♂; 10-15 m), sta. 19 (4 ♂♂, 4 ♀♀; 0.5 m), sta. 20 (3 ♂♂; 1 m), sta. 23 (1 ♂, 1 ♀; 1 m).

Paranthura nigropunctata (Lucas, 1846)

Material: 9 ♂♂, 11 ♀♀; sta. 6 (2 ♂♂, 1 ♀; 1 m), sta. 11 (2 ♂♂; 20-30 m), sta. 15 (1 ♂, 2 ♀♀; 0.5-1 m), sta. 16 (2 ♀♀; 1 m), sta. 17 (2 ♂♂, 1 ♀; 2-50 m), sta. 18 (2 ♂♂, 2 ♀♀; 1-25 m), sta. 22 (2 ♂♂; 0.5-1 m), sta. 23 (1 ♀; 1 m).

ASELLOTA

FAM: ASELLIDAE

Asellus aquaticus Linnaeus, 1758*

Material: 82 ♂♂, 38 ♀♀; sta. 4 (6 ♂♂, 2 ♀♀; 0-0.5 m), sta. 9 (11 ♂♂, 4 ♀♀; 0-0.5 m), sta. 11 (11 ♂♂, 7 ♀♀; 0-0.5 m), sta. 13 (12 ♂♂, 4 ♀♀; 0-0.5 m), sta. 18 (7 ♂♂, 5 ♀♀; 0-0.5 m), sta. 23 (35 ♂♂, 16 ♀♀; 0-0.5 m).

Records are available from the Mediterranean (Perrier, 1930; Remy, 1941) and the Aegean Sea coast of Greece (Schmalfus, 1975). This is the first record of the species from the Turkish Aegean Sea coast and Turkish seas.

FAM: JANIRIDAE

Carpas stebbingi (Monod, 1933)

Material: 154 ♂♂, 137 ♀♀; sta. 1 (3 ♂♂, 6 ♀♀; 4-5 m), sta. 2 (3 ♂♂, 2 ♀♀; 1-2 m), sta. 3 (8 ♂♂, 10 ♀♀; 1-2 m), sta. 7 (19 ♂♂, 10 ♀♀; 0.5-2 m), sta. 8 (6 ♂♂, 7 ♀♀; 1-2 m), sta. 9 (2 ♂♂, 4 ♀♀; 0.5-1 m), sta. 11 (23 ♂♂, 23 ♀♀; 0.5-1 m), sta. 13 (5 ♂♂, 3 ♀♀; 1 m), sta.15 (21 ♂♂, 10 ♀♀; 0.5-2 m), sta. 17 (2 ♂♂, 5 ♀♀; 0.5-1 m), sta. 19 (12 ♂♂, 11 ♀♀; 1-5 m), sta. 20 (14 ♂♂, 18 ♀♀; 0.5-1 m), sta. 21 (12 ♂♂, 9 ♀♀; 4-5 m), sta. 22 (9 ♂♂, 5 ♀♀; 0.5-1 m), sta.23 (15 ♂♂, 14 ♀♀; 3-10 m).

Janiropsis brevimis (Sars, 1883)*

Material: 19 ♂♂, 10 ♀♀; sta. 5 (2 ♂♂, 2 ♀♀; 5-6 m), sta. 13 (3 ♂♂, 4 ♀♀; 4-5 m), sta. 17 (3 ♂♂, 1 ♀; 4-5 m), sta. 21 (4 ♂♂, 2 ♀♀; 4-5 m), sta. 22 (7 ♂♂, 1 ♀; 4-5 m).

Records are available from the Mediterranean (Monod, 1923; Schmalfuss, 1975). This is the first record from the Turkish Aegean Sea coast and Turkish seas.

Jaera bocqueti Veuille & Kocatas, 1979

Material: 2 ♂♂, 1 ♀; sta. 3 (2 ♂♂, 1 ♀; 0-0.5 m)

Jaera italica Kesselyak, 1938

Material: 17 ♂♂, 11 ♀♀; sta. 11 (9 ♂♂, 5 ♀♀; 0-0.5 m), sta. 13 (4 ♂♂, 3 ♀♀; 0-0.5 m), sta. 21 (4 ♂♂, 3 ♀♀; 0-0.5 m).

Jaera hopeana Costa, 1853

Material: 24 ♂♂, 35 ♀♀; sta. 5 (6 ♂♂, 8 ♀♀; 0-0.5 m), sta. 7 (3 ♂♂, 6 ♀♀; 0-0.5 m), sta. 7 (3 ♂♂, 6 ♀♀; 0-0.5 m), sta. 10 (5 ♂♂, 2 ♀♀; 0-0.5 m), sta. 11 (4 ♂♂, 8 ♀♀; 0-0.5 m), sta. 12 (3 ♂♂, 3 ♀♀; 0-0.5 m), sta. 15 (1 ♂, 3 ♀♀; 0-0.5 m), sta. 18 (2 ♂♂, 5 ♀♀; 0-0.5 m).

Jaera nordmanni (Rathke, 1837)

Material: 30 ♂♂, 17 ♀♀; sta. 3 (4 ♂♂, 2 ♀♀; 0-0.5 m), sta. 6 (6 ♂♂, 2 ♀♀; 0.5-1 m), sta. 7 (5 ♂♂, 6 ♀♀; 0-0.5 m), sta. 9 (4 ♂♂, 3 ♀♀; 0.5-1 m), sta. 12 (5 ♂♂, 1 ♀; 0-0.5 m), sta.14 (6 ♂♂, 3 ♀♀; 0.5-1 m).

Jaera nordmanni massiliensis Lemercier, 1960

Material: 9 ♂♂, 3 ♀♀; sta. 14 (1 ♂, 1 ♀; 0.5-1 m), sta. 15 (6 ♂♂; 2 ♀♀; 0.5-1 m), sta. 23 (2 ♂♂; 0.5-1 m).

Janira maculosa Leach, 1814

Material: 72 ♂♂, 45 ♀♀; sta. 3 (7 ♂♂, 4 ♀♀; 5-40 m), sta. 4 (2 ♂♂, 3 ♀♀; 4-30 m), sta.5 (4 ♂♂, 2 ♀♀; 20-25 m), sta. 9 (4 ♂♂, 2 ♀♀; 5-35 m), sta. 11 (18 ♂♂, 16 ♀♀; 4-30 m), sta. 12 (9 ♂♂, 5 ♀♀; 5-80 m), sta. 13 (13 ♂♂, 3 ♀♀; 5-50 m), sta. 16 (1 ♀; 35 m), sta. 17 (3 ♂♂, 2 ♀♀; 5-50 m), sta. 18 (5 ♂♂, 2 ♀♀; 50-60 m), sta. 19 (2 ♂♂, 2 ♀♀; 4-5 m), sta. 21 (3 ♂♂, 1 ♀; 4-5 m), sta. 22 (2 ♂♂; 2 ♀♀; 5-6 m).

FAM: JOEROPSIDAE

Joeropsis brevicornis littoralis Amar, 1949

Material: 36 ♂♂, 31 ♀♀; sta. 3 (5 ♂♂, 2 ♀♀; 0.5-1 m), sta. 4 (7 ♂♂, 4 ♀♀; 3-5 m), sta. 6 (1 ♂; 25 m), sta. 9 (6 ♂♂, 8 ♀♀; 0.5-1 m), sta. 11 (3 ♂♂, 1 ♀♀; 0.5-1 m), sta. 13 (2 ♀♀; 1 m), sta. 16 (5 ♂♂, 3 ♀♀; 0.5-1 m), sta. 19 (2 ♀♀; 0.5-1 m), sta. 22 (6 ♂♂, 3 ♀♀; 0.5-1 m), sta. 23 (3 ♂♂, 6 ♀♀; 0.5-1 m).

FAM: MUNNIDAE

Uromunna petiti (Amar, 1948)*

Material: 22 ♂♂, 17 ♀♀; sta. 7 (1 ♂♂, 3 ♀♀; 0.5-1 m), sta. 9 (4 ♂♂, 3 ♀♀; 0.5-1 m), sta. 11 (9 ♂♂, 6 ♀♀; 0.5-1 m), sta. 15 (6 ♂♂, 4 ♀♀; 0-0.5 m), sta. 18 (2 ♂♂, 1 ♀♀; 0.5-1 m).

Records are given from the Mediterranean (Amar, 1948; George and Menzies, 1968), but it is hitherto unknown from the Turkish Aegean Sea coast and Turkish seas.

FLABELLIFERA

FAM: AEGIDAE

Rocinela dumerili (Lucas, 1849)*

Material: 4 ♂♂; sta. 4 (2 ♂♂; 70-80 m), sta. 11 (2 ♂♂; 10-20 m)

The species was recorded from the Mediterranean (Gourret, 1891; Monod, 1923; Perrier, 1930; George and Menzies, 1968). This is the first record from the Turkish Aegean Sea coast and Turkish seas.

FAM: CIROLANIDAE

Cirolana cranchii Leach, 1818*

Material: 14 ♂♂, 6 ♀♀; sta. 1 (1 ♂, 1 ♀ 0.5-1 m), sta. 3 (1 ♀; 100 m), sta. 4 (1 ♂, 1 ♀; 70-80 m), sta. 5 (3 ♂♂; 3-5 m), sta. 17 (2 ♂♂, 1 ♀; 0.5-1 m), sta. 18 (3 ♂♂, 1 ♀; 40-60 m), sta. 19 (2 ♂♂, 1 ♀; 0.5-1 m), sta. 22 (2 ♂♂; 2-3 m).

Known from the Mediterranean (Gourret, 1891; Monod, 1923; Perrier, 1930; Ledoyer, 1962; Larwood, 1940), but hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Eurydice affinis Hansen, 1905*

Material: 35 ♂♂, 15 ♀♀; sta. 3 (2 ♂♂, 1 ♀; 100 m), sta. 8 (4 ♂♂, 1-2 m), sta. 9 (1 ♂, 1-2 m), sta. 11 (4 ♂♂, 3 ♀♀; 20-30 m), sta. 14 (1 ♂, 2 ♀♀; 1 m), sta. 16 (13 ♂♂, 4 ♀♀; 1 m), sta. 17 (3 ♂♂, 2 ♀♀; 10-15 m), sta. 18 (1 ♂, 2 ♀♀; 2 m), sta. 19 (3 ♂♂, 1 ♀; 30-35 m).

Reported from the Mediterranean (Monod, 1923; Arcangeli, 1930), but hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Eurydice inermis Hansen, 1890*

Material: 29 ♂♂, 10 ♀♀; sta. 11 (7 ♂♂, 2 ♀♀; 35-40 m), sta. 16 (16 ♂♂, 6 ♀♀; 1-2 m), sta. 17 (6 ♂♂, 2 ♀♀; 1-2 m).

Reported from the Mediterranean and Aegean Seas (Monod, 1923; Arcangeli, 1930; Fage, 1933; Larwood, 1940), but hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Eurydice pulchra Leach, 1815*

Material: 46 ♂♂, 49 ♀♀; sta. 2 (4 ♂♂, 6 ♀♀; 1-2 m), sta. 3 (10 ♂♂, 6 ♀♀; 1-2 m), sta. 11 (1 ♀; 1 m), sta. 15 (1 ♂, 2 ♀♀; 1-2 m), sta. 16 (11 ♂♂, 9 ♀♀; 2-3 m), sta. 17 (11 ♂♂, 7 ♀♀; 2 m), sta. 18 (6 ♂♂, 11 ♀♀; 1-2 m), sta. 20 (1 ♂; 120 m), sta. 23 (2 ♂♂, 7 ♀♀; 1-2 m).

The species is reported from the Mediterranean coasts (Gourret, 1891; Monod, 1923; Perrier, 1930; Arcangeli, 1930), but is hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Natanolana neglecta (Hansen, 1890)

Material: 12 ♂♂, 7 ♀♀; sta. 5 (1 ♀; 25-35 m), sta. 6 (1 ♀; 25-30 m), sta. 11 (11 ♂♂, 5 ♀♀; 10-50 m), sta. 20 (1 ♂; 100-120 m).

FAM: CYMOTHOIDAE

Colombia physodes (Linnaeus, 1758)

Material: 33 ♂♂, 9 ♀♀; sta. 11 (14 ♂♂, 4 ♀♀; 5-35 m), sta. 12 (2 ♂♂, 1 ♀; 8-10 m), sta. 13 (1 ♂, 1 ♀ 15-20 m), sta. 15 (10 ♂♂, 2 ♀♀; 30-35 m), sta. 19 (3 ♂♂, 1 ♀; 20-25 m), sta. 20 (3 ♂♂; 25-30 m).

Emetha audouini (Milne-Edwards, 1840)*

Material: 3 ♂♂; sta. 11 (3 ♀♀; 25-30 m).

The species was reported from the Mediterranean (Gourret, 1891; Balcells, 1953; Trilles, 1962, 1986), but is hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

FAM: LIMNORIIDAE

Limnoria tuberculata Sowinsky, 1884

Material: 11 ♂♂, 7 ♀♀; sta. 9 (7 ♂♂, 4 ♀♀; 30-40 m), sta. 13 (1 ♂, 1 ♀; 40-50 m), sta. 17 (3 ♂♂, 2 ♀♀; 4-5 m).

FAM: SPHAEROMATIDAE

Cymodoce emarginata Leach, 1818

Material: 44 ♂♂, 52 ♀♀; sta. 2 (4 ♂♂, 2 ♀♀; 0.5-1 m), sta. 3 (5 ♂♂, 5 ♀♀; 1-60 m), sta. 4 (5 ♂♂, 1 ♀; 1-2 m), sta. 5 (5 ♂♂, 5 ♀♀; 1-10 m), sta. 6 (4 ♂♂, 13 ♀♀; 0.5-1 m), sta. 9 (9 ♂♂, 6 ♀♀; 0.5-1 m), sta. 16 (4 ♂♂, 15 ♀♀; 1-2 m), sta. 17 (1 ♂, 2 ♀♀; 1-2 m), sta. 19 (6 ♂♂; 1-2 m), sta. 21 (1 ♂, 3 ♀♀; 0.5-2 m).

Cymodoce hanseni Dumay, 1972*

Material: 12 ♂♂, 14 ♀♀; sta. 3 (3 ♂♂, 5 ♀♀; 5-40 m), sta. 4 (1 ♂, 1 ♀; 4-5 m), sta. 15 (1 ♂; 3 ♀♀; 100-120 m), sta. 19 (2 ♂♂, 2 ♀♀; 4-5 m), sta. 20 (2 ♂♂, 2 ♀♀; 4-5 m), sta. 21 (3 ♂♂, 1 ♀; 4-6 m).

Records of the species were given from the Mediterranean (Dumay, 1970, 1972) and the Greek coast of the Aegean Sea (Dounas and Koukouras, 1986). This is the first record from the Turkish Aegean Sea coast and Turkish seas.

Cymodoce spinosa (Risso, 1816)

Material: 39 ♂♂, 20 ♀♀; sta. 6 (2 ♂♂, 2 ♀♀; 0.5-1 m), sta. 7 (1 ♂; 0.5-1 m), sta. 8 (3 ♂♂; 0.5-1 m), sta. 11 (23 ♂♂, 13 ♀♀; 0.5-35 m), sta. 12 (2 ♂♂, 1 ♀; 1-2 m), sta. 18 (5 ♂♂, 2 ♀♀; 40-50 m), sta. 20 (3 ♂♂, 2 ♀♀; 30-40 m).

Cymodoce truncata Leach, 1814

Material: 10 ♂♂, 16 ♀♀; sta. 5 (2 ♂♂; 4-5 m), sta. 6 (1 ♂, 6 ♀♀; 25-30 m), sta. 9 (1 ♂; 1-2 m), sta. 13 (1 ♂, 2 ♀♀; 18-20 m), sta. 19 (2 ♂♂, 8 ♀♀; 0.5-1 m), sta. 21 (3 ♂♂; 1-2 m).

Cymodoce tuberculata Costa in Hope, 1851

Material: 9 ♂♂, 4 ♀♀; sta. 8 (3 ♂♂, 1 ♀; 4-5 m), sta. 9 (3 ♂♂; 0.5-1 m), sta. 18 (1 ♂, 1 ♀; 5-6 m), sta. 23 (2 ♂♂, 1 ♀; 0.5-2 m).

Dynamene bifida Torelli, 1930*

Material: 1 ♂, 4 ♀♀; sta. 4 (1 ♂, 3 ♀♀; 3-5 m), sta. 21 (1 ♀; 4-5 m).

This species was known from the Mediterranean (Torelli, 1930; Ledoyer, 1962; Holdich; 1970), but is hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Dynamene edwardsi (Lucas, 1849)

Material: 56 ♂♂, 134 ♀♀; sta. 3 (3 ♂♂, 5 ♀♀; 0.5-1 m), sta. 5 (1 ♂, 2 ♀♀; 0.5-1 m), sta. 6 (7 ♂♂, 9 ♀♀; 0.5-1 m), sta. 7 (28 ♂♂, 88 ♀♀; 0.5-1 m) sta. 8 (2 ♂♂, 3 ♀♀; 0.5-1 m), sta. 9 (9 ♂♂, 12 ♀♀; 0.5-1 m), sta. 16 (2 ♂♂, 2 ♀♀; 0.5-1 m), sta. 20 (4 ♀♀; 0.5-1 m), sta. 23 (4 ♂♂, 9 ♀♀; 0.5-1 m).

Dynamene torelliae Holdich, 1968

Material: 93 ♂♂, 134 ♀♀; sta. 3 (1 ♂; 3-4 m), sta. 4 (7 ♂♂, 6 ♀♀; 0.5-2 m), sta. 5 (14 ♂♂, 15 ♀♀; 1 m), sta. 6 (2 ♂♂, 2 ♀♀; 0.5-1 m), sta. 7 (2 ♂♂, 1 ♀; 1 m), sta. 9 (12 ♂♂, 10 ♀♀; 0.5-1 m), sta. 11 (19 ♂♂, 37 ♀♀; 0.5-1 m), sta. 13 (6 ♂♂, 7 ♀♀; 0.5-1 m), sta. 15 (15 ♂♂, 30 ♀♀; 0.5-1 m), sta. 16 (3 ♂♂, 8 ♀♀; 0.5-1 m), sta. 16 (3 ♂♂, 8 ♀♀; 0.5-1 m), sta. 19 (2 ♂♂, 6 ♀♀; 0.5-2 m), sta. 20 (3 ♂♂, 5 ♀♀; 0.5-2 m), sta. 23 (7 ♂♂, 7 ♀♀; 0.5-1 m).

Ischyromene lacazei Racovitza, 1908*

Material: 19 ♂♂, 33 ♀♀; sta. 21 (5 ♂♂, 11 ♀♀; 0.5-1 m), sta. 22 (6 ♂♂, 9 ♀♀; 0.5-1 m), sta. 23 (8 ♂♂, 13 ♀♀; 0.5-1 m).

The species is recorded from the Mediterranean (Racovitza, 1908), but is hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Lekanesphaera hookeri (Leach, 1814)

Material: 36 ♂♂, 114 ♀♀; sta. 13 (5 ♂♂, 9 ♀♀; 0-0.5 m), sta. 16 (7 ♂♂, 20 ♀♀; 0-0.5 m), sta. 21 (15 ♂♂, 52 ♀♀; 0-0.5 m), sta. 23 (9 ♂♂, 33 ♀♀; 0-0.5 m).

Lekanesphaera monodi (Arcangeli, 1934)*

Material: 80 ♂♂, 31 ♀♀; sta. 2 (6 ♂♂, 2 ♀♀; 0-0.5 m), sta. 6 (3 ♂♂, 1 ♀; 0-0.5 m), sta. 7 (43 ♂♂, 17 ♀♀; 0-0.5 m), sta. 18 (10 ♂♂, 4 ♀♀; 0-0.5 m), sta. 19 (6 ♂♂, 1 ♀♀; 0-0.5 m), sta. 21 (3 ♂♂; 0-0.5 m), sta. 23 (9 ♂♂, 6 ♀♀; 0-0.5 m).

Known from the Mediterranean (Lejuez, 1966), but hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Sphaeroma pulchellum (Colosi, 1921)*

Material: 17 ♂♂, 8 ♀♀; sta. 6 (6 ♂♂, 3 ♀♀; 0-0.5 m), sta. 7 (4 ♂♂, 1 ♀; 0-0.5 m), sta. 13 (2 ♂♂, 2 ♀♀; 0-0.5 m), sta. 16 (5 ♂♂, 2 ♀♀; 0-0.5 m).

Reported from the Mediterranean (Torelli, 1930; Monod, 1932) and the Black Sea (Pauli, 1954), but hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

Sphaeroma serratum (Fabricius, 1787)

Material: 295 ♂♂, 226 ♀♀; sta. 2 (6 ♂♂, 5 ♀♀; 0-0.5 m), sta. 3 (17 ♂♂, 6 ♀♀; 0-0.5 m), sta. 5 (8 ♂♂, 11 ♀♀; 0-0.5 m), sta. 6 (10 ♂♂, 6 ♀♀; 0-0.5 m), sta. 7 (6 ♂♂, 4 ♀♀; 0-0.5 m), sta. 8 (9 ♂♂, 2 ♀♀; 0-0.5 m), sta. 10 (28 ♂♂, 19 ♀♀; 0-0.5 m), sta. 11 (58 ♂♂, 52 ♀♀; 0-0.5 m), sta. 12 (50 ♂♂, 35 ♀♀; 0-0.5 m), sta. 13 (41 ♂♂, 30 ♀♀; 0-0.5 m), sta. 14 (4 ♂♂, 3 ♀♀; 0-0.5 m), sta. 15 (5 ♂♂, 9 ♀♀; 0-0.5 m), sta. 16 (11 ♂♂, 9 ♀♀; 0-0.5 m), sta. 18 (7 ♂♂, 3 ♀♀; 0-0.5 m), sta. 19 (11 ♂♂, 3 ♀♀; 0-0.5 m), sta. 21 (14 ♂♂, 17 ♀♀; 0-0.5 m), sta. 22 (10 ♂♂, 12 ♀♀; 0-0.5 m).

Sphaeroma walkeri (Stebbing, 1905)

Material: 2 ♂♂, 10 ♀♀; sta. 22 (3 ♀♀; 0-0.5 m), sta. 23 (2 ♂♂, 7 ♀♀; 0-0.5 m).

Reported from the Mediterranean (Monod, 1931; Larwood, 1940) and Turkish Mediterranean coasts (Kocataş, 1978), but hitherto unrecorded from the Turkish Aegean Sea coast.

GNATHIIDEA

FAM: GNATHIIDAE

Gnathia vorax (Lucas, 1849)

Material: 41 ♂♂, 19 ♀♀; sta. 2 (1 ♂, 1 ♀; 4-5 m), sta. 3 (2 ♂♂; 90 m), sta. 4 (5 ♂♂, 1 ♀; 5-80 m), sta. 5 (2 ♂♂, 1 ♀; 10 m), sta. 6 (4 ♂♂, 2 ♀♀; 35-40 m), sta. 9 (5 ♂♂, 3

♀; 15 m), sta. 11 (10 ♂, 5 ♀; 5-30 m), sta. 13 (3 ♂, 1 ♀; 18-50 m), sta. 19 (3 ♂, 1 ♀; 2-10 m), sta. 20 (2 ♂, 1 ♀; 30-120 m), sta. 23 (4 ♂, 3 ♀; 5-30 m).

VALVIFERA

FAM: ARCTURIDAE

Astacilla longicornis (Sowerby, 1806)*

Material: 2 ♂, 3 ♀; sta. 11 (1 ♂, 1 ♀; 5-8 m), sta. 12 (1 ♂, 1 ♀; 60-80 m), sta. 15 (1 ♀; 4-5 m).

Known from the Mediterranean (Monod, 1923; Perrier, 1930; Ledoyer, 1962) but hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

FAM: IDOTEIDAE

Idotea balthica (Pallas, 1772)

Material: 71 ♂, 43 ♀; sta. 1 (2 ♂, 1 ♀; 3-4 m), sta. 3 (7 ♂, 3 ♀; 1-2 m), sta. 5 (4 ♂, 1 ♀; 1 m), sta. 6 (20 ♂, 12 ♀; 0.5-1 m), sta. 7 (1 ♂; 0.5-1 m), sta. 11 (17 ♂, 10 ♀; 0.5-2 m), sta. 14 (2 ♂, 2 ♀; 0.5-1 m), sta. 15 (2 ♂, 2 ♀; 3-5 m), sta. 16 (2 ♂, 2 ♀; 0.5-1 m), sta. 17 (1 ♂, 2-3 m), sta. 18 (11 ♂, 6 ♀; 0.5-1 m), sta. 23 (2 ♂, 2 ♀; 1-2 m).

Idotea hectica (Pallas, 1772)

Material: 4 ♂, sta. 3 (1 ♂; 0.5-1 m), sta. 8 (1 ♂; 1 m), sta. 9 (2 ♂; 1 m).

Idotea metallica Bosc, 1802

Material: 4 ♂, sta. 11 (2 ♂, 0-50 m), sta. 12 (2 ♂, 0-50 m).

Reported from the Mediterranean (Dollfus, 1895; Monod, 1923; Perrier, 1930; Picard, 1965; George-Menzies, 1968), Black Sea (Collinge, 1916), Sea of Marmara and İstanbul strait (Collinge, 1916; Demir, 1952), and the Aegean Sea coast of Greece (Veini and Kiortsis, 1974; Schmalfuss, 1975). A new record for the Turkish Aegean Sea coast.

Synisoma appendiculata (Risso, 1816)

Material: 22 ♂, 17 ♀; sta. 2 (2 ♂, 1 ♀; 0.5-1 m), sta. 3 (5 ♂, 6 ♀; 5-10 m), sta. 5 (1 ♂, 1 ♀; 4-5 m), sta. 6 (2 ♂, 2 ♀; 1 m), sta. 15 (3 ♂, 3 ♀; 3-4 m), sta. 17 (4 ♂, 2 ♀; 10-15 m), sta. 22 (2 ♂; 2 ♀; 1-2 m), sta. 23 (3 ♂; 0.5-1 m).

Synisoma capito (Rathke, 1837)

Material: 31 ♂, 66 ♀; sta. 1 (2 ♀; 3-4 m), sta. 3 (1 ♂, 6 ♀; 2-10 m), sta. 5 (1 ♂, 7 ♀; 0.5-1 m), sta. 6 (3 ♂, 2 ♀; 0.5-1 m), sta. 7 (14 ♂, 23 ♀; 0.5-1 m), sta. 9 (1 ♂, 3 ♀; 0.5-1 m), sta. 11 (3 ♂, 5 ♀; 5-30 m), sta. 12 (1 ♂, 1 ♀; 90-100 m), sta. 15 (1 ♂, 8 ♀; 0.5-3 m), sta. 17 (2 ♀; 10-15 m); sta. 19 (3 ♂, 2 ♀; 1-2 m), sta. 20 (1 ♀; 85 m), sta. 23 (3 ♂, 4 ♀; 1 m).

ONISCIDEA

FAM: ARMADILLIDAE

Armadilloniscus littoralis Budde-Lund, 1885

Material: 20 ♂, 11 ♀; sta. 3 (2 ♂, 1 ♀; 0-0.5 m), sta. 5 (5 ♂, 2 ♀; 0-0.5 m), sta. 6 (1 ♂, 2 ♀; 0-0.5 m), sta. 11 (5 ♂, 3 ♀; 0-0.5 m), sta. 14 (2 ♂; 0-0.5 m), sta. 18 (3 ♂, 2 ♀; 0-0.5 m), sta. 23 (2 ♂, 1 ♀; 0-0.5 m).

FAM: LIGIIDAE

Ligia italica Fabricius, 1798

Material: 28 ♂, 24 ♀; sta. 2 (2 ♂, 2 ♀; 0-0.1 m), sta. 3 (5 ♂, 5 ♀; 0-0.1 m), sta. 5 (2 ♂, 3 ♀; 0-0.1 m), sta. 6 (2 ♂; 0-0.1 m), sta. 11 (1 ♂, 4 ♀; 0-0.1 m), sta. 12 (4 ♂, 2 ♀; 0-0.1 m), sta. 13 (4 ♂, 3 ♀; 0-0.1 m), sta. 16 (4 ♂, 1 ♀; 0-0.1 m), sta. 19 (3 ♂, 2 ♀; 0-0.1 m), sta. 22 (1 ♂, 2 ♀; 0-0.1 m).

FAM: PHILOSCIIDAE

Halophiloscia couchi (Kinahan, 1858)*

Material: 12 ♂, 14 ♀; sta. 5 (1 ♀; 0-0.5 m), sta. 6 (1 ♂, 1 ♀; 0-0.5 m), sta. 7 (1 ♂; 0-0.5 m), sta. 16 (6 ♂, 8 ♀; 0-0.5 m), sta. 21 (1 ♂, 1 ♀; 0-0.5 m), sta. 23 (3 ♂, 3 ♀; 0-0.5 m).

Reported from the Atlantic Ocean, Netherlands coast (Holthuis, 1956), Mediterranean (Harding, 1975), and the Aegean Sea coast of Greece (Schmalfuss, 1975) but hitherto unrecorded from the Turkish Aegean Sea coast and Turkish seas.

FAM: TYLIDAE

Tylos latreillei Audouin, 1825

Material: 32 ♂, 49 ♀; sta. 3 (3 ♂, 6 ♀; 0-0.5 m), sta. 5 (5 ♂, 3 ♀; 0-0.5 m), sta. 7 (4 ♂, 4 ♀; 0-0.5

m), sta. 9 (4 ♂♂, 1 ♀; 0-0.5 m), sta. 11 (8 ♂♂, 28 ♀♀; 0-0.5 m), sta. 19 (4 ♂♂, 3 ♀♀; 0-0.5 m), sta. 23 (4 ♂♂, 4 ♀♀; 0-0.5 m).

Ecological findings

An evaluation of the 50 species, collected from 17 various biotopes by 163 samplings, revealed that 50 species were free-living. Parasitic species were not taken into consideration (Table 1).

Most of the species were encountered at algal biotopes (32 species), followed by bare or algae covered stony biotopes (27 species) and *Posidonia* meadows (24 species). The lowest number of species (1 species) was observed on wooden material and *Cymodocea* beds. The examination of biotope preferences of species revealed that *G. vorax* is distributed at 8 different biotopes, *J.*

maculosa at 7 biotopes, and 25 species at only 1 biotope. Among 25 species found in 1 type of biotope, 40% (10 species) had a preference for bare or algae covered stony biotopes.

Discussion

In this research, 50 species were determined. Among these, 20 are new records for the Turkish Aegean Sea coast, while the remaining 18 species are recorded for the first time from Turkish seas. Most of them are eurybiots of Mediterranean-Atlantic origin.

An evaluation of the species collected from 17 various biotopes at 23 stations revealed that 50 species were free-living (Table 2). From the species obtained in this study, *Sphaeroma serratum* was encountered at 17 stations, *Carpas stebbingi* at 15 stations, and *Dynamene*

Table 2. Isopod fauna of Turkish Seas (*-New for Turkish fauna)

	Black Sea	Marmara and İstanbul Strait.	Aegean Sea	Mediterranean
ANTHURIDEA				
<i>Anthura gracilis</i> (Montagu, 1808)*	-	-	11	-
<i>Apanthura corsica</i> Amar, 1953*	-	-	11	-
<i>Cyathura carinata</i> (Kroyer, 1848)	-	-	6, 11	-
<i>Paranthura costana</i> Bate & Westwood, 1868	-	-	6, 11	-
<i>Paranthura nigropunctata</i> (Lucas, 1846)	-	-	8, 11	-
ASELLOTA				
<i>Asellus aquaticus</i> Linnaeus, 1758*	-	-	11	-
<i>Jaeropsis brevicornis littoralis</i> Amar, 1949	-	-	8, 11	-
<i>Carpas stebbingi</i> (Monod, 1933)	-	-	6, 9, 11	-
<i>Janiropsis breviremis</i> (Sars, 1883)*	-	-	11	-
<i>Jaera bocqueti</i> Veuille & Kocataş, 1978	-	-	10, 11	-
<i>Jaera italica</i> Kesselyak, 1938	-	-	10, 11	-
<i>Jaera hopeana</i> Costa, 1853	-	-	6, 9, 10, 11	-
<i>Jaera nordmanni</i> (Rathke, 1837)	-	5	6, 10, 11	-
<i>Jaera nordmanni massiliensis</i> Lemerrier, 1960	-	-	11	-
<i>Janira maculosa</i> Leach, 1814	-	5	6, 9, 11	-
<i>Uromunna petiti</i> (Amar, 1948)*	-	-	11	-
FLABELLIFERA				
<i>Cirolana cranchii</i> Leach, 1818*	-	-	11	-
<i>Eurydice affinis</i> Hansen, 1905*	-	-	11	-

Table 2. (Continued)

<i>Eurydice inermis</i> Hansen, 1890*	-	-	11	-
<i>Eurydice pulchra</i> Leach, 1815*	-	-	11	-
<i>Natatolana neglecta</i> (Hansen, 1890)	-	-	6, 11	-
<i>Limnoria tuberculata</i> Sowinsky, 1884	7	2, 5	6, 7, 11	7
<i>Colombia physodes</i> (Linnaeus, 1758)	-	5	6, 11	4
<i>Emetha audouini</i> (Milne-Edwards, 1840)*	-	-	11	-
<i>Rocinela dumerili</i> (Lucas, 1849)*	-	-	11	-
<i>Cymodoce emarginata</i> Leach, 1818	-	2	6, 8, 11	-
<i>Cymodoce hansenii</i> Dumay, 1972*	-	-	11	-
<i>Cymodoce spinosa</i> (Risso, 1816)	-	-	6, 8, 11	-
<i>Cymodoce truncata</i> Leach, 1814	-	-	8, 11	-
<i>Cymodoce tuberculata</i> Costa in Hope, 1851	-	-	6, 11	-
<i>Dynamene bifida</i> Torelli, 1930*	-	-	11	-
<i>Dynamene edwardsi</i> (Lucas, 1849)	-	-	6, 11	-
<i>Dynamene torelliae</i> Holdich, 1968	-	5	6, 11	-
<i>Ischyromene lacazei</i> Racovitza, 1908*	-	-	11	-
<i>Lekanesphaera hookeri</i> (Leach, 1814)	-	-	6	-
<i>Lekanesphaera monodi</i> (Arcangeli, 1934)*	-	-	11	-
<i>Sphaeroma pulchellum</i> (Colosi, 1921)*	-	-	11	-
<i>Sphaeroma serratum</i> (Fabricius, 1787)	1	2, 5	6	-
<i>Sphaeroma walkeri</i> (Stebbing, 1905)	-	-	11	9
GNATHIIDEA				
<i>Gnathia vorax</i> (Lucas, 1849)	-	-	6	-
VALFIFERA				
<i>Astacilla longicornis</i> (Sowerby, 1806)*	-	-	11	-
<i>Idotea balthica</i> (Pallas, 1772)	-	5	6, 9	-
<i>Idotea hectica</i> (Pallas, 1772)	-	5	6, 9	-
<i>Idotea metallica</i> Bosc, 1802	3	3, 5	11	-
<i>Synisoma appendiculata</i> (Risso, 1816)	-	-	6, 9	-
<i>Synisoma capito</i> (Rathke, 1837)	-	2, 5	6, 9	-
ONISCOIDEA				
<i>Tylos latreillei</i> Audouin, 1825	-	5	6	-
<i>Ligia italica</i> Fabricius, 1798	-	5	6, 9	-
<i>Armadilloniscus littoralis</i> Budde-Lund, 1885	-	-	6	-
<i>Halophiloscia couchi</i> (Kinahan, 1858)*	-	-	11	-

1- Colombo (1885); 2- Sowinsky (1898); 3- Collinge (1916); 4- Monod (1913); 5- Demir (1952); 6- Geldiay and Kocataş (1972); 7- Kühne (1972); 8- Kocataş (1976); 9- Kocataş, (1978); 10- Veuille and Kocataş (1978); 11- This study.

toralliae, *Janira maculosa* and *Synisoma capito* at 13 stations, and it was seen that they were more widespread than the others. Some species that were obtained previously were not encountered in this study. The reason for that may be that the entire sublittoral zone was not examined.

Based on previous research carried out on Turkish coasts, 4 species were reported from the Black Sea (Colombo, 1885; Collinge, 1916; Jones, 1969; Kühne, 1972), 17 species from the Sea of Marmara and Bosphorus (Sowinsky, 1898; Collinge, 1916; Demir, 1952), 37 species from the Aegean Sea (Geldiay and Kocataş, 1972; Kühne, 1972; Kocataş, 1976, 1978) and 5 species from the Mediterranean (Monod, 1931; Kühne,

1972; Kocataş, 1978), totaling 41 isopod species from the entire Turkish coasts. *Dynamena bidentata* has been recorded from the Marmara and Aegean seas (Sowinsky, 1898, Demir, 1952, Kocataş, 1976), and *D. magnitorata* has been recorded from the Marmara Sea (Kocataş, 1976), but their actual presence is doubtful (Kırkı, 1998). *Dynamene torelliae* is very variable species and the shape of the pleotelsonic boss can vary from 2 small bosses to a well-formed projection. Our male specimens have the typical *D. torelliae* boss but it is less developed. By the addition of the 18 new records found in this study, the total number of species has increased to 59. Moreover, the isopod fauna of the Turkish Aegean Sea coast has increased from 37 to 57 species (Table 1).

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