

Isopod fauna, excluding Epicaridea, from the Strait of Gibraltar and nearby areas (Southern Iberian Peninsula)*

JOSÉ CASTELLÓ¹ and JOSÉ LUIS CARBALLO²

¹Departament de Didàctica de les Ciències Experimentals i de la Matemàtica, Universitat de Barcelona, Passeig de la Vall d'Hebron, 171, 08035 Barcelona, Spain. E-mail: jcastello@d5.ub.es

²Instituto de Ciencias del Mar y Limnología, UNAM, Estación Mazatlán, Apartado Postal 811, Mazatlán 82000 México.

SUMMARY: A total of 42 isopod species from the Strait of Gibraltar and nearby areas were found, including the first record of *Munna fabricii*, *Monodanthurus maroccana*, *Campecopea hirsuta*, and *Natolana gallica* from the Mediterranean; *Synisoma nadejda* and *Uromunna petiti* from the Atlantic; and *Munna fabricii*, *Uromunna petiti*, *Monodanthurus maroccana*, *Stellanthurus cryptobia* and *Natolana gallica* from the Iberian waters. This article includes the previous records from the Iberian waters for all the species. The greatest number of species were found in Tarifa (16 species), located in the transition zone between the Atlantic Ocean and the Mediterranean Sea. According to depth, the distribution of species was as follows: 18 species were collected in the intertidal zone, mostly *Dynamene edwardsi* and *Ischyromene lacazei*; 33 species were found between 1 and 10 m, 13 species were found between 11 and 20 m, and 6 species were found between 21 and 28 m, mostly *Janira maculosa*. According to habitat, 16 species were collected on soft bottoms, 2 species on *Zostera*, and 22 species on algae substrata, mostly *Halopteris*, *Asparagopsis* and *Cystoseira*. The most diverse genus was *Cymodoce* (5 species). This paper contributes to the taxonomic, faunistic and biogeographical knowledge of the benthic communities from the Strait of Gibraltar and nearby areas.

Key words: Crustacea, Isopoda, taxonomy, biogeography, Strait of Gibraltar.

INTRODUCTION

The crustacean isopods from the Iberian Peninsula have hitherto been studied solely from a taxonomic and monographic point of view on the Catalan and Balearic Islands' coasts (Castelló, 1984, 1985, 1986a, 1986b), in Galicia (Reboreda, 1995; Reboreda and Urgorri, 1995) and recently in the Strait of Gibraltar and the Alborán Sea (Rodríguez-Sánchez *et al.*, in press). Arrontes (1987) studied the adaptative strategies of intertidal species in Asturias,

and Arrontes and Anadón (1990a,b) studied 31 species in the same area. The remaining available data is dispersed throughout numerous studies of littoral benthic communities in the Peninsula, specifically in the Basque Country (San Vicente and Sorbe, 1993), Cantabria (López-Cotelo *et al.*, 1982), Asturias (Lombas and Anadón, 1985; Viejo and Arrontes, 1992), Galicia (Viéitez, 1982; Penas and González, 1983; Planas, 1986; Junoy and Viéitez, 1988; Planas and Mora, 1989; Junoy and Viéitez, 1990b; Palacio *et al.*, 1991; Pérez-Edrosa and Junoy, 1991; Pérez-Edrosa and Junoy, 1993; Palacio *et al.*, 1993; Junoy and Viéitez, 1992; García *et al.*, 1993;

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Mazé *et al.*, 1993; Junoy, 1996), Portugal (Rodrigues and Dauvin, 1987; Dexter, 1990; Cunha *et al.*, 1997; Cunha *et al.*, 1999), Andalusia (Cano and García, 1987; Rodríguez and Viéitez, 1992; Mayoral *et al.*, 1994; Drake *et al.*, 1997), Murcia (Ros *et al.*, 1987), Catalonia (Margalef *et al.*, 1971; San Vicente and Sorbe, 1993) and the Balearic Islands (Margalef, 1953). Other works on bathyal communities contain data on various isopod species, for example in the Basque Country (Marquiegui and Sorbe, 1999), Portugal (Cunha *et al.*, 1997) and Catalonia (Cartes and Sorbe, 1993).

The Strait of Gibraltar is key to our knowledge of the isopod fauna from the Iberian Peninsula because of its privileged location between the Mediterranean Sea and the Atlantic Ocean. Previous research in the area, such as those of Camiñas (1984) and Cano and García (1987) in the Huelva estuary, Mayoral *et al.* (1994) in the mouth of the Piedras River (Huelva), Rodríguez and Viéitez (1992) in Punta Umbría (Huelva), and Drake *et al.* (1997), Rallo *et al.* (1987) in the Bay of Cadiz, have evidenced the presence of 21 species in the Atlantic Andalusian coasts. In recent years new species have been described in the Strait of Gibraltar (Castelló, 1997; Castelló and Carballo, 2000), which points to the fact that the isopod fauna from the area remains relatively unknown.

Even more recently, Rodríguez-Sánchez *et al.* (in press) studied the collection from the oceanographic campaign “Fauna I”, composed of 32 samples obtained by trawling in the open sea or at considerable depths (only 14 were obtained at less than 44 m depth). The study cites 58 species, 28 of them found in the 14 samples from shallower depths. To this end, the greatest variety of communities and substrates were sampled (hard and soft bottoms, fauna associated to algae and animal organisms) in order to estimate the entire diversity of this group in the area.

Our results can be compared to those published in Rodríguez-Sánchez *et al.* (in press) and to those obtained from areas previously studied: the Balearic-Catalan littoral zone (Castelló, 1984, 1985, 1986a, 1986b; Castelló and Poore, 1998), Asturias (Arrontes and Anadón, 1990a,b) and the Galician littoral zone (Reboreda, 1995; Reboreda and Otero, 1989, 1990; Reboreda and Urgorri, 1995; Reboreda and Wägele, 1992; Reboreda *et al.*, 1994).

The main goal of this work was to study the distribution of the isopods in the Strait of Gibraltar, and to try to define the limits of distribution for species endemic to the Mediterranean, or for Atlantic species which have not penetrated into the Mediterranean.

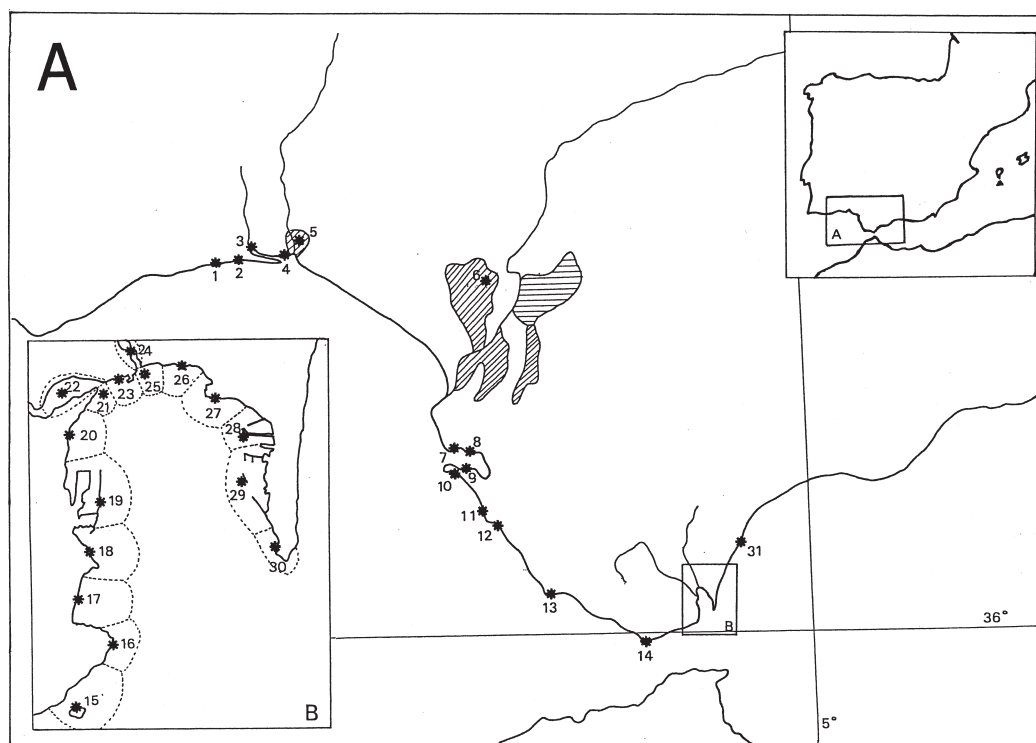


FIG. 1. – Map of the Strait of Gibraltar and nearby areas, and location of the stations sampled.

TABLE 1. – List of sampling stations and geographical location.

Station	Locality	Position
1	Cristina Island (Huelva)	37°13'N 07°05'W
2	La Antilla (Huelva)	37°11'N 07°00'W
3	Piedras River (Huelva)	37°13'N 06°57'W
4	El Portil (Huelva)	37°10'N 06°54'W
5	Mudflats of Odiel River (Huelva)	37°16'N 06°52'W
6	Mudflats of Guadalquivir River (Seville)	36°54'N 06°17'W
7	La Caleta (Cadiz)	36°37'N 06°20'W
8	Santa María del Mar (Cadiz)	36°36'N 06°17'W
9	Cadiz Bay (Cadiz)	36°30'N 06°14'W
10	El Chato (Cadiz)	36°30'N 06°17'W
11	Fuente del Gallo, Conil (Cadiz)	36°25'N 06°12'W
12	El Arrecifillo, Conil (Cadiz)	36°22'N 06°11'W
13	Caños de Meca (Cadiz)	36°10'N 06°00'W
14	Tarifa and Tarifa Island (Cadiz)	36°00'N 05°37'W
15	Cala Fuerte (Palomas Island), Algeciras Bay (Cadiz)	36°02'N 05°28'W
16	Punta Carnero, Algeciras Bay (Cadiz)	36°04'N 05°27'W
17	Getares Creek, Algeciras Bay (Cadiz)	36°05'N 05°27'W
18	Cucareo Creek (San García), Algeciras Bay (Cadiz)	36°06'N 05°27'W
19	Algeciras Harbour, Algeciras Bay (Cadiz)	36°07'N 05°28'W
20	Los Golones (El Rinconcillo), Algeciras Bay (Cadiz)	36°09'N 05°27'W
21	Mouth of Palmones River, Algeciras Bay (Cadiz)	36°10'N 05°26'W
22	Palmones River and Mudflats, Algeciras Bay (Cadiz)	36°10'N 05°27'W
23	Acerinox, Algeciras Bay (Cadiz)	36°10'N 05°26'W
24	Guadarranque River and Mudflats, Algeciras Bay (Cadiz)	36°11'N 05°26'W
25	Mouth of Guadarranque River, Algeciras Bay (Cadiz)	36°10'N 05°25'W
26	Refinery, Algeciras Bay (Cadiz)	36°10'N 05°24'W
27	Crinavis, Algeciras Bay (Cadiz)	36°09'N 05°24'W
28	Port of La Línea de la Concepción, Algeciras Bay (Cadiz)	36°09'N 05°23'W
29	Gibraltar Harbour, Algeciras Bay (Cadiz)	36°08'N 05°23'W
30	Punta Europa, Algeciras Bay (Cadiz)	36°06'N 05°22'W
31	Patricia (Cadiz)	36°18'N 05°16'W

MATERIAL AND METHODS

Sampling was carried out from 1988 to 1992, in the area between the western limit of the Huelva province and the eastern limit of the Cadiz province (Fig. 1, Table 1). A total of 253 samples from 31 stations were collected (Table 2). Sampling on hard bottoms was done by scuba diving, and a Van Veen grab was used on soft bottoms.

The geographical distribution is given for each species, with concrete locations for the Iberian Peninsula.

The taxonomical information is outlined according to the Wägele (1991) systematic criteria.

The collection is located at the Departament of Didàctica de les Ciències Experimentals i de la Matemàtica, University of Barcelona.

RESULTS

A total of 1200 specimens were studied, belonging to 42 species, 30 genera, 16 families and 6 suborders.

Order ISOPODA Latreille, 1817
 Suborder ASELOTA Latreille, 1803
 Superfamily JANIROIDEA Sars, 1897
 Family JANIRIDAE Sars, 1897
 Genus *Janira* Leach, 1814

Janira maculosa Leach, 1814

Diagnosis. Leach (1814): Brewster's Edinburgh Encyclopaedia, 7: 383-439.

Synonymies. *Oniscoda maculosa* Latreille, 1829; *Oniscoda maculosa* Milne-Edwards, 1840; *Henomopus muticus* Kröyer, 1847; *Henomopus muticus* Hansen, 1887; *Henomopus muticus* Richardson, 1900.

Material examined. Station 1, Sample 4.031: 1 male; St 2, Sp 4.043: 2 females; St 12, Sp 4.119: 1 f, 1 juvenile; St 14, Sp 2.022: 1 f; St 15, Sp 4.021: 2 m, 1 f; St 16, Sp 4.007: 1 m; St 17, Sp 4.009: 1 m, 2 f; St 17, Sp 4.035: 1 f; St 18, Sp 2.021: 1 f; St 18, Sp 4.013: 1 m, 1 f; St 18, Sp 4.027: 4 m, 3 f; St 18, Sp 4.024: 3 m; St 18, Sp 4.020: 1 m; St 19, Sp 4.006: 3 f; St 20, Sp 4.025: 1 f; St 20, Sp 4.022: 1 m, 1 f; St 20, Sp 4.004: 1 m; St 20, Sp 4.003: 1 f; St 21, Sp 4.008: 1 f; St 23, Sp 4.012: 2 f; St 26, Sp 4.015: 6 m, 3 f; St 26, Sp 4.017: 1 f; St 26, Sp 4.042: 2 m; St 26, Sp 4.026: 1 f; St 27, Sp 2.024: 1 f; St 27, Sp 4.001: 4 m, 10 f; St 27, Sp 4.002: 1 m; St 27, Sp 4.005: 1 f; St 27, Sp 4.030: 1 f; St 28, Sp 4.010: 3 m, 5 f; St 28, Sp 4.023: 2 m, 5 f; St 28, Sp 4.028: 3 f; St 28, Sp 4.011: 4 f; St 28, Sp 4.016: 1 f; St 29, Sp 4.018: 1 f; St 31, Sp 5.007: 1 m.

Distribution. Greenland, European Atlantic, and western Mediterranean. Registers from the Iberian waters include Polo *et al.* (1982) and Reboreda (1995) in Galicia, Castelló (1986b) in Catalonia, and

Rodríguez-Sánchez *et al.* (in press) from both sides of the Strait of Gibraltar.

Remarks. The data given by Rodríguez-Sánchez *et al.* (in press) and in our study confirm that this species is widely distributed throughout the Iberian littoral zone. Samples for our study were taken between 0 and 27 m on various substrata: algae (*Peysonnelia*, *Codium*, *Colpomenia*), calcareous substrata (*Mesophyllum*, polychaete tubes), sediment, sponges (*Axinella*, *Ircinia*) and starfish (*Marthasterias*).

Family JOEROPSIDAE Nordenstam, 1933

Genus *Joeropsis* Koehler, 1885

Joeropsis brevicornis Koehler, 1885

Diagnosis. Koehler (1885): Ann. Sci. Nat. Zool., 6 sér., 19: 1-7.

Synonymy. *Joeropsis littoralis* Amar, 1949.

Material examined. Station 14, Sample 4.029: 1 male; St 18, Sp 1.012: 1 m.

Distribution. European Atlantic and Mediterranean. The specimens studied belong to the subspecies *J. brevicornis littoralis* Amar, 1949, which is distributed in the Mediterranean. It has also been cited from Asturias (Arrontes and Anadón, 1990a), the Balearic Islands (Castelló, 1986b), and the Andalusian Mediterranean coasts (Rodríguez-Sánchez *et al.*, in press).

Remarks. Tarifa is on the dividing line between the Mediterranean Sea and the Atlantic Ocean, so some of the specimens were collected at their western distribution limit. The individuals were sampled on *Gelidium*, taken between 0 and 2 m.

Family MUNNIDAE Sars, 1899

Genus *Munna* Kröyer, 1839

Munna fabricii Kröyer, 1846

Diagnosis. Kröyer (1846): Nat. Tidsskr., Ser. 2, 2 (2): 1-123.

Material examined. Station 14, Sample 2.025: 1 female; St 17, Sp 4.035: 1 male, 1 f; St 31, Sp 4.116: 1 f.

Distribution. European Atlantic shores. This southernmost record is the first from the Iberian littoral zone, and the species has also been found in the Mediterranean.

Remarks. Two females and a male were dissected. The operculum of the female is not as indented as in the figure by Carton (1961); it is only slightly concave. One of these specimens has somewhat inconspicuous spines on the proximal third, while the other one has two pairs of spines. However, the shape of the male first pleopod confirms that the

specimens belong to this species. The specimens were collected at depths from 3 to 12 m, on *Sargassum*.

Genus *Uromunna* Menzies, 1962

Uromunna petiti (Amar, 1948)

Diagnosis. Amar (1948): Bull. Mus. Hist. Nat. Marseille, 8 (2-3): 62-73.

Synonymies. *Munna petiti* Amar, 1948; *Munna petiti* Carton, 1961; *Munna petiti* Wolf, 1962; *Munna petiti* Schiecke and Fresi, 1972; *Munna (Uromunna) petiti* Menzies, 1962; *Munna (Uromunna) petiti* Kussakin, 1962.

Material examined. Station 12, Sample 5.003: 1 male; St 18, Sp 2.043: 1 m.

Distribution. French-Italian Mediterranean coasts. This is the first record from the Iberian littoral zone and the Atlantic Ocean.

Remarks. The westernmost record of this species is from El Arrecifillo (Conil, Cádiz). Sampled on *Halopteris*, taken from 5 to 12 m.

Superfamily STENETRIOIDEA Hansen, 1905

Family STENETRIIDAE Hansen, 1905

Genus *Stenetrium* Haswell, 1881

Stenetrium mediterraneum Hansen, 1905

Diagnosis. Hansen (1905a): Proc. Zool. Soc. London 1904, 2 (2): 302-331.

Material examined. Station 14, Sample 2.023: 1 female.

Distribution. Western Mediterranean. The species was found in the Balearic Islands (Castelló, 1986b). This is the first record from the Iberian Peninsula.

Remarks. The record from Tarifa marks the western limit of distribution for this species. It was collected at a depth of 12 m.

Suborder ANTHURIDEA Leach, 1814

Family ANTHURIDAE Leach, 1814

Genus *Anthura* Leach, 1814

Anthura gracilis (Montagu, 1808)

Diagnosis. Montagu (1808): Trans. Linn. Soc. London, 9: 81-144.

Synonymy. *Oniscus gracilis* Montagu, 1808.

Material examined. Station 17, Sample 5.005: 1 juvenile; St 19, Sp 3.052: 1 female; St 20, Sp 3.59: 1 f; St 20, Sp 3.056: 1 j; St 20, Sp 3.057: 1 f; St 27, Sp 4.109: 1 f.

Distribution. Registered from the Mediterranean and the European and African Atlantic coast. Bolívar (1892), Polo *et al.* (1982), Negoescu and Wägele (1984), and Arrontes and Anadón (1990a,b) cited it from the northern Iberian Peninsula, Reboreda (1995), from Galicia, and Rodríguez-Sánchez *et al.* (in press) from Andalusia. Bibiloni (1983), Carbonell (1984), and Castelló (1985, 1986b) cited it

from the Catalan littoral, and Castelló (1985, 1986b), cited it from the Balearic Islands.

Remarks. Statocysts in the dissected manca specimen not seen. The species was collected at depths from 4 to 16 m.

Genus *Cyathura* Norman and Stebbing, 1886

Cyathura carinata (Krøyer, 1847)

Diagnosis. Krøyer (1847): Nat. Tidsskr., Ser. 12, 2: 366-446.
Synonymies. *Anthura carinata* Krøyer, 1847; *Anthura carinata* Apstein, 1909; *Cyathura estuaria* Müller and Burbanck, 1961.
Material examined. Station 9, Sample 1.007: 1 female; St 9, Sp 2.035: 1 f; St 9, Sp 4.032: 4 f; St 9, Sp 4.033: 11 f; St 22, Sp 3.50: 2 f; St 22, Sp 3.061: 2 juveniles; St 22, Sp 3.065: 2 f; St 22, Sp 3.066: 1 j; St 22, Sp 3.069: 2 j; St 22, Sp 3.070: 1 f; St 22, Sp 3.074: 1 j; St 24, Sp 3.046: 5 f; St 24, Sp 3.047: 4 f, 14 j; St 24, Sp 3.062: 1 male, 3 f, 13 j; St 24, Sp 3.063: 8 f, 41 j; St 24, Sp 3.064: 4 j; St 24, Sp 3.071: 8 f.

Distribution. European and Mediterranean Atlantic. Registered from the northern Iberian coasts (Arrontes and Anadón, 1990a,b; Sola and Arzubialde, 1993), from Galicia (Junoy and Viéitez, 1988, 1990b, 1992; Mazé *et al.*, 1993; Reboreda, 1995), on the Andalusian Atlantic coasts (Camiñas, 1984; Cano and García, 1987; Rallo *et al.*, 1987; Mayoral *et al.*, 1994; Drake *et al.*, 1997; Rodríguez-Sánchez *et al.* (in press)), and from Catalonia and the Balearic Islands (Castelló, 1985, 1986b).

Remarks. This is the dominant anthurid species from the Iberian littoral zone. It is adapted to great changes in salinity and is characteristic of estuarine and delta soft bottoms, although it has been frequently collected on photophile and sciaphile algae and *Posidonia* (Castelló, 1986b). In this study, it was collected at depths of 0-4 m, always in sediment.

Genus *Monodanthura* Wägele and Platvoet, 1982

Monodanthura maroccana Wägele and Platvoet, 1982

Diagnosis. Wägele and Platvoet (1982): Bull. Zool. Mus. Univ. Amsterdam, 8 (25): 213-220.
Material examined. Station 17, Sample 3.060: 4 juveniles; St 25, Sp 3.072: 1 female, 1 j.

Distribution. European and African Atlantic coasts. It is the first record from the Iberian waters and the Mediterranean.

Remarks. Setae on the outer margin of the uropodal exopod are plumous, giving a particular bushy appearance to this region of the body. The record from Algeciras Bay is the eastern limit of distribution for the species. It was collected in sediment, at depths of 3-10 m.

Family HYSSURIDAE Wägele, 1981

Genus *Stellanthura* Wägele, 1979

Stellanthura cryptobia Wägele, 1979

Diagnosis. Wägele (1979): Mitt. Zool. Mus. Univ. Kiel, 1 (2): 21-27.

Material examined. Station 14, Sample 4.120: 1 male; St 27, Sp 3.067: 1 juvenile.

Distribution. Registered on Italian coasts. This is the first record for the Iberian waters.

Remarks. The record from Tarifa is its western limit of distribution. The species was found at 3-27 m, on the sponge *Reniera valliculata* and the gorgonian *Eunicella* sp.

Family PARANTHURIDAE Menzies and Glynn, 1968

Genus *Paranthura* Bate and Westwood, 1868

Paranthura costana Bate and Westwood, 1868

Diagnosis. Bate and Westwood (1868): A history of British sessile-eyed Crustacea, 2.

Synonymy. *Paranthura nigropunctata* Norman and Stebbing, 1886.

Material examined. Station 18, Sample 2.018: 2 females, 5 juveniles.

Distribution. European and African Atlantic coasts and Mediterranean Sea. Registered on the Galician coasts by Polo *et al.* (1982) and Reboreda (1995), and on the Andalusian coasts by Rodríguez-Sánchez *et al.* (in press). Castelló (1985, 1986b) recorded it from Catalonia and the Balearic Islands, and Franch and Ballesteros (1993), from the Balearic Islands.

Remarks. This species is smaller and thinner than *Paranthura nigropunctata* (Lucas, 1849), and frequently found on *Posidonia oceanica* roots (Wägele, 1982; Müller, 1994) as well as on brown and red algae like *Halopteris* and on *Zostera* (Müller, 1994). In our study it was found on *Halopteris*, at 5 m.

Paranthura nigropunctata (Lucas, 1849)

Diagnosis. Lucas (1849): Explor. Sci. de l'Algérie, Zool. 1: 1-403.
Synonymies. *Anthura nigropunctata* Lucas, 1849; *Leptanthura melanomma* Vanhöffen, 1925.

Material examined. Station 7, Sample 3.051: 1 juvenile; St 12, Sp 4.118: 1 female; St 14, Sp 1.010: 2 males, 1 f; St 15, Sp 3.058: 1 m; St 16, Sp 3.054: 1 m; St 19, Sp 3.048: 1 f; St 19, Sp 3.073: 1 m, 2 f; St 20, Sp 3.059: 1 f; St 27, Sp 3.055: 1 f; St 27, Sp 3.049: 1 f; St 27, Sp 3.068: 1 f; St 31, Sp 4.115: 2 f; St 31, Sp 4.116: 2 f; St 31, Sp 5.008: 1 m, 1 j.

Distribution. European and African Atlantic littoral, and Mediterranean. Recorded from the north of Spain (Monod, 1925; Lombas and Anadón, 1985; Arrontes and Anadón, 1990a,b), Galicia (Anadón,

1975; Reboreda, 1995), and Andalusia (Rodríguez-Sánchez *et al.* (in press)).

Remarks. This species is larger and more robust than *Paranthura costana* Bate and Westwood, 1868, found mainly on algae (Wägele, 1982), brown algae (*Dictyopteris*, *Cystoseira*, *Halopteris*, *Halopytis*, *Sargassum*) and red algae (*Phyllophora*, *Peysonnelia*) (Müller, 1994) as well as on *Posidonia oceanica* (Müller, 1994). In our study, it was found on *Halopteris*, *Dilophus*, *Udotea*, *Taonia*, *Asparagopsis*, *Cladostephus*, *Cystoseira*, *Jania* and *Sargassum*, and in sediment, at 0 – 27 m.

Suborder VALVIFERA Sars, 1882

Family ARCTURIDAE White, 1840

Genus *Arcturella* Sars, 1899

Arcturella damnoniensis (Stebbing, 1874)

Diagnosis. Stebbing (1874): Ann. and Mag. Nat. Hist., 4 (13): 291-293.

Synonymy. *Arcturus damnoniensis* Stebbing, 1874.

Material examined. Station 29, Sample 5.001: 1 female.

Distribution. British Isles, French Atlantic and Mediterranean coasts (also Naples (Norman, 1904)). Registered in Asturias (Arrontes and Anadón, 1990b). This is the second record from the Iberian waters.

Remarks. The specimen has dorsal tubercles at a point of development halfway between those described by Stebbing (1874) and Bocquet and Duchet-Bertin (1967). The tubercle on the third pereonite is smaller than that in both figures, while the central tubercle on the fourth pereonite, thick and slightly inclined backwards, resembles the figure by Stebbing (1874), and is not as sharp as in the figure by Bocquet and Duchet-Bertin (1967). We collected it on *Halopteris*, at 28 m.

Arcturella poorei Castelló, 1997

Diagnosis. Castelló (1997): Sci. Mar., 61 (3): 305-311.

Material examined. Station 13, Sample 3.013: 2 females.

Distribution. The only record available is from the type locality, on the Andalusian Atlantic coast.

Remarks. This species is easily distinguishable by the dorsal hunch on the fourth pereonite. Collected on *Sphaerococcus coronopifolius*, at 4 m.

Genus *Astacilla* Cordiner, 1793

Astacilla cingulata Castelló and Carballo, 2000

Diagnosis. Castelló and Carballo (2000): Ophelia, 52 (1): 45-56.

Material examined. Station 20, Sample 3.019: 1 female.

Distribution. The only record is from the type locality in Algeciras Bay.

Remarks. This species is characterized by a waist at the end of the fourth pereonite. Collected on *Sphaerococcus coronopifolius*, at 9 m.

Astacilla mediterranea Koehler, 1911

Diagnosis. Koehler (1911): Bull. Inst. Océanogr. Monaco, 214: 1-65.

Material examined. Station 17, Sample 3.012: 1 male; St 18, Sp 3.011: 1 female; St 20, Sp 3.019: 3 m, 4 f, 3 juveniles; St 20, Sp 3.020: 1 f; St 20, Sp 3.023: 1 f; St 27, Sp 3.004: 1 m, 1 f.

Distribution. French Mediterranean coast. There is a doubtful record by Franch and Ballesteros (1993) from the Balearic Islands. Castelló and Carballo (2000) cited it as a species accompanying the holotypes of *A. cingulata* Castelló and Carballo, 2000 and *A. paucisaetosa* Castelló and Carballo, 2000, from Algeciras Bay.

Remarks. This species was described from samples collected at Villefranche-sur-mer (France). Castelló and Carballo (2000) cited it for the first time from the Iberian littoral zone. It was collected at 3-12 m, on *Padina*, *Sphaerococcus* and *Halopteris*.

Astacilla paucisaetosa Castelló and Carballo, 2000

Diagnosis. Castelló and Carballo (2000): Ophelia, 52 (1): 45-56.

Material examined. Station 20, Sample 3.019: 3 females.

Distribution. The only record available is from the type locality in Algeciras Bay.

Remarks. This species has a smooth but bulky dorsal surface on the fourth pereonite in its proximal section. Collected at 9 m, on *Sphaerococcus coronopifolius*.

Family HOLOGNATHIDAE G. Thomson, 1904

Genus *Cleantis* Dana, 1849

Cleantis prismatica (Risso, 1826)

Diagnosis. Risso (1826): Histoire naturelle des principales productions de l'Europe méridionale, 5.

Synonymies. *Zenobia prismatica* Risso, 1826; *Zenobia prismatica* Dollfus, 1894; *Zenobia mediterranea* Risso, 1826; *Idotea chelipes* Costa, 1838; *Idotea prismatica* Milne-Edwards, 1840; *Idotea prismatica* Heller, 1866; *Idotea parallela* Bate and Westwood, 1868; *Idotea (Zenobia) prismatica* Miers, 1881; *Zenobiana prismatica* Castelló, 1984; *Zenobiana prismatica* Castelló, 1986b.

Material examined. Station 27, Sample 3.001: 1 female.

Distribution. British Isles, European Atlantic and Mediterranean littoral zone. Recorded from Asturias (Arrontes and Anadón, 1990a,b) and Galicia (Anadón, 1975). Also mentioned by Castelló (1984,

1986b) from Catalonia and the Balearic Islands.

Remarks. There is no data on the substratum where the specimen was collected, but we know it is a tubicolous species (Issel, 1913), living in habitats like polychaete tubes or root cavities of *Posidonia* (Castelló, 1986b). Collected at 6 m.

Family IDOTEIDAE Samouelle, 1819

Genus *Idotea* Fabricius, 1798

Idotea chelipes (Pallas, 1766)

Diagnosis. Pallas (1766): Misc. Zool. quibus novae imprimis atque obscurae animalium species describuntur et observationibus iconibusque illustrantur.

Synonymies. *Oniscus chelipes* Pallas, 1766; *Oniscus viridis* Slabber, 1778; *Idotea phosphorea* Hoek, 1889; *Idotea salinarum* Dollfus, 1895; *Idotea viridis* Sars, 1899; *Idotea angusta* Sars, 1899; *Idotea viridis* Norman, 1904; *Idotea viridis* Collinge, 1917; *Idotea viridis* Naylor, 1955; *Idotea neglecta* Castelló, 1986b; *Idotea viridis* Castelló, 1986b.

Material examined. Station 4, Sample 1.003: 1 juvenile; St 4, Sp 2.028: 1 female, 3 j; St 5, Sp 2.058: 2 f; St 5, Sp 2.054: 1 f, 62 j; St 5, Sp 2.059: 3 males; St 9, Sp 1.004: 2 f, 2 j; St 9, Sp 4.033: 1 m; St 9, Sp 4.034: 1 m.

Distribution. European and Mediterranean Atlantic coast. In the Iberian waters, it has been recorded from Galicia (Junoy and Viéitez, 1988, 1990a, 1992; Planas, 1986; Planas and Mora, 1989; Palacio *et al.*, 1991, 1993; Reboreda, 1995), the Andalusian coast (Rallo *et al.*, 1987; Drake *et al.*, 1997) and Catalonia (Castelló, 1986b, as *I. neglecta* and *I. viridis*).

Remarks. Males are thinner and larger than females. In the Foz estuary, Junoy and Viéitez (1990a) found females up to 10 mm in size and males up to 16.2 mm. The coloration is variable due to the uneven presence of chromatophores. The species was collected at 0-1 m depth, on *Cystoseira*, *Enteromorpha*, *Gracilaria*, *Zostera* and in sediment.

Idotea metallica Bosc, 1802

Diagnosis. Bosc (1802): In G.L.L. Buffon. Histoire Naturelle des Crustacés.

Synonymies. *Idotea rugosa* Milne-Edwards, 1840; *Idotea robusta* Kröyer, 1846; *Idotea robusta* Reinhardt, 1857; *Idotea robusta* Stimpson, 1871; *Idotea robusta* Harger, 1874; *Idotea robusta* Lutken, 1875; *Idotea compacta* White, 1847; *Idotea annulata* Dana, 1849; *Idotea annulata* Cunningham, 1871; *Idotea argentea* Dana, 1849; *Idotea argentea* Miers, 1868.

Material examined. Station 29, Sample 3.009: 1 female.

Distribution. European and Mediterranean Atlantic coasts. Recorded by Castelló (1986b) from Catalonia and the Balearic Islands.

Remarks. The specimen was collected in a sediment sample at a depth of 15 m, but this species is known to passively move about on the surface of

objects or floating plant remains (Castelló, 1986b). Juveniles are sometimes found in plankton (Tattersall, 1911; Macquard-Moulin, 1969).

Genus *Synisoma* Collinge, 1917

Synisoma nadejda Rezig, 1989

Diagnosis. Rezig (1989): Rev. Fac. Sci. Tunis, 4, sér. D: 29-80.

Synonymies. *Synisoma capito* Castelló, 1984; *Synisoma capito* Castelló, 1986b.

Material examined. Station 7, Sample 3.007: 2 males, 3 females; St 10, Sp 3.021: 2 m, 64 juveniles; St 11, Sp 3.014: 1 m, 2 f, 2 j; St 11, Sp 3.002: 1 m; St 13, Sp 3.022: 8 j; St 13, Sp 3.005: 1 m, 1 f, 16 j; St 13, Sp 3.025: 6 j; St 14, Sp 1.006: 2 m; St 14, Sp 2.016: 1 f; St 14, Sp 3.003: 4 m, 2 f; St 14, Sp 3.008: 1 m; St 14, Sp 3.024: 1 m, 4 f, 5 j; St 14, Sp 2.052: 1 j; St 31, Sp 5.008: 1 m.

Distribution. Mediterranean. Castelló (1984, 1986b) recorded it from Catalonia and the Balearic Islands (as *S. capito*), and Rodríguez-Sánchez *et al.* (in press) found it at the western limit of the Mediterranean, close to Tarifa. In our study, the species was found west of Cadiz, which is the first record for the Atlantic coasts.

Remarks. The specimens from Catalonia and Balearic Islands studied by Castelló (1984, 1986b) were incorrectly determined as *S. capito* (Rathke, 1837). Rezig (1989) redetermined them correctly as *S. nadejda* Rezig, 1989 when this species was described. We collected it at depths from 0-14 m, on algae (*Halopteris*, *Cystoseira*, *Jania*, *Taonia*, *Halopitys*, *Cladostephus*, *Sphaerococcus* and *Asparagopsis*).

Suborder SPHAEROMATIDEA Wägele, 1989

Family SPHAEROMATIDAE Milne-Edwards, 1840

Genus *Campecopea* Leach, 1814

Campecopea hirsuta (Montagu, 1804)

Diagnosis. Montagu (1804): Trans. Linn. Soc. London, 7: 61-85.

Synonymy. *Oniscus hirsutus* Montagu, 1804.

Material examined. Station 14, Sample 4.055: 5 females; St 16, Sp 2.047: 1 f.

Distribution. European and African Atlantic shores. Recorded from the north of the Iberian waters (Arrontes and Anadón, 1990a,b), Galicia (García *et al.*, 1993; Reboreda, 1995), and Andalusia (Drake *et al.*, 1997). This is the first record for the Mediterranean.

Remarks. Species frequently associated to the lichen *Lichina pygmaea*, on mid-littoral bottoms. We located it on *Asparagopsis*, at 2 m.

Genus *Cymodoce* Leach, 1814

Cymodoce emarginata Leach, 1818

Diagnosis. Leach (1818): Dictionnaire des Sciences Naturelles, 12. *Synonymies.* *Cymodocea emarginata* Leach, 1818; *Cymodocea emarginata* Desmarest, 1825; *Cymodocea emarginata* Milne-Edwards, 1840; *Cymodocea emarginata* Bate and Westwood, 1868; *Cymodocea emarginata* Gourret, 1891; *Sphaeroma emarginata* Bosc, 1830.

Material examined. Station 10, Sample 5.002: 1 male.

Distribution. British Isles, French Atlantic coast, Western African and Mediterranean Atlantic. Recorded from Galicia (Reboreda, 1995), Asturias (Arrontes and Anadón, 1990a) Catalonia and the Balearic Islands (Castelló, 1986b).

Remarks. This species is characteristic of superficial murky substrata, seeking protection in *Posidonia* prairies and macroalgae (Dumay, 1971). The specimen we found was collected at 0 m, in a *Halopteris* and *Codium* sample.

Cymodoce robusta Nierstrasz, 1918

Diagnosis. Nierstrasz (1918): Zool. Meded., 4(2): 103-142.

Material examined. Station 13, Sample 3.037: 1 juvenile; St 13, Sp 4.048: 1 male.

Distribution. North African Atlantic coast. Also recorded from the Galician littoral (Reboreda, 1995) and close to Tarifa (Rodríguez-Sánchez *et al.* (in press)).

Remarks. Reboreda (1995) recorded it in samples of *Chondrus*, *Himantalia*, *Corallina* and *Codium*. The species was found on *Cymodocea* and *Padina*, collected at 3 m.

Cymodoce rubropunctata (Grube, 1864)

Diagnosis. Grube (1864): Die Inseln Lussin und ihre Meeresfauna. *Synonymies.* *Sphaeroma rubropunctatum* Grube, 1864; *Sphaeroma granulatum* Milne-Edwards, 1866; *Dynamene corallina* Gourret, 1891.

Material examined. Station 27, Sample 2.048: 1 male; St 28, Sp 3.039: 2 m.

Distribution. Mediterranean and Atlantic. Recorded by Rodríguez-Sánchez *et al.* (in press) from the Andalusian Mediterranean littoral. There is also a record from Asturias (Arrontes and Anadón, 1990b).

Remarks. This species is characteristic of muddy detritic communities (Dumay, 1971). We located it in a sediment sample and also on *Microcosmus*, at depth of 6-22 m.

Cymodoce tattersalli Torelli, 1928

Diagnosis. Torelli (1928): Boll. Soc. Nat. Napoli, 40 (42): 57-65.

Synonymies. *Sphaeroma granulatum* (Milne-Edwards) sensu Heller, 1866; *Cymodoce granulatum* (Milne-Edwards) sensu Tattersall, 1905.

Material examined. Station 14, Sample 1.008: 1 juvenile; St 19, Sp 3.044: 1 j; St 19, Sp 3.043: 1 j; St 20, Sp 2.015: 1 male, 1 j; St 20, Sp 3.029: 1 j; St 27, Sp 3.035: 1 m, 2 j; St 27, Sp 3.031: 3 m; St 28, Sp 3.038: 1 m; St 31, Sp 5.008: 1 m, 8 j.

Distribution. British Isles and Mediterranean. Registered from Catalonia and the Balearic Islands (Castelló, 1986b), Galicia (Reboreda, 1995), and close to the Andalusian Atlantic coast (Rodríguez-Sánchez *et al.* (in press)).

Remarks. Species typical of *Posidonia oceanica* habitats, frequently on shell bottoms and gravel in the deep infralittoral (Dumay, 1971). Our samples are from *Asparagopsis*, *Jania*, *Microcosmus* and sediment, collected at 3-16 m.

Cymodoce truncata Leach, 1814

Diagnosis. Leach (1814): Brewster's Edinburgh Encyclopaedia, 7: 383-439.

Synonymies. *Cymodocea truncata* Leach, 1814; *Cymodocea truncata* Desmarest, 1825; *Cymodocea truncata* Milne-Edwards, 1840; *Cymodocea truncata* Bate and Westwood, 1868; *Cymodocea truncata* Hesse, 1872; *Cymodocea emarginata* Leach, 1818; *Sphaeroma curtum* Leach, 1818; *Sphaeroma curtum* Desmarest, 1825; *Sphaeroma curtum* Milne-Edwards, 1840; *Sphaeroma curtum* Bate and Westwood, 1868; *Sphaeroma prideauxianum* Leach, 1818; *Sphaeroma prideauxianum* Desmarest, 1825; *Sphaeroma prideauxianum* Milne-Edwards, 1840; *Sphaeroma prideauxianum* Bate and Westwood, 1868; *Cymodocea pilosa* Milne-Edwards, 1840; *Cymodocea pilosa* Lucas, 1849; *Cymodocea pilosa* Stalio, 1877; *Cymodocea pilosa* Carus, 1885; *Dynamene setosa* Gourret, 1891; *Sphaeroma inerme* Tattersall, 1904; *Cymodoce pilosa* Hansen, 1905; *Cymodoce pilosa* Stebbing, 1910; *Cymodoce richardsoniae* Nobili, 1906; *Cymodoce robusta* Nierstrasz, 1918.

Material examined. Station 11, Sample 3.036: 1 male; St 12, Sp 5.003: 2 juveniles; St 14, Sp 2.045: 1 j; St 15, Sp 3.030: 2 j; St 15, Sp 4.041: 1 j; St 16, Sp 4.040: 1 j; St 18, Sp 1009: 3 j; St 18, Sp 2.018: 20 j; St 18, Sp 3.026: 1 m; St 18, Sp 5.006: 3 j; St 19, Sp 3.028: 1 m; St 22, Sp 3.053: 1 j; St 27, Sp 3.040: 2 j; St 27, Sp 3.027: 15 j; St 27, Sp 3.032: 1 j; St 27, Sp 3.033: 1 j; St 27, Sp 3.034: 1 j; St 27, Sp 4.110: 1 m, 1 j; St 28, Sp 4.059: 1 j; St 28, Sp 3.042: 1 j; St 31, Sp 4.116: 2 females.

Distribution. European and African Atlantic and Mediterranean. Registered repeatedly from the Iberian waters (De Buen, 1887; Bolívar, 1892; Margalef *et al.*, 1971; Anadón, 1975; Chinchilla and Comín, 1977; Polo *et al.*, 1982; Bibiloni, 1983; Carbonell, 1984; Castelló, 1985, 1986a, 1986b; Arrontes and Anadón, 1990a; Arrontes, 1990, 1991; Reboreda, 1995; Drake *et al.*, 1997) and the Balearic Islands (Barceló, 1875; De Buen, 1916; Monod, 1931; Castelló, 1986a, 1986b; Franch and Ballesteros, 1993).

Remarks. Species characteristic of *Posidonia oceanica*, especially on roots, in the deep infralittoral (Dumay, 1971). However, in our study it was found on samples of *Halopteris*, *Asparagopsis*, *Colpomenia*, *Cladostephus*, *Sargassum*, *Caulerpa* and on sediment, between 0-20 m.

Genus *Dynamene* Leach, 1814
Dynamene bidentata (Adams, 1800)

Diagnosis. Adams (1800): Trans. Linn. Soc. London, 5: 7-13.
Synonymies. *Oniscus bidentatus* Adams, 1800; *Nesaea bidentata* Leach, 1814; *Nesaea bidentata* White, 1850; *Naesa bidentata* Leach, 1815; *Naesa bidentata* Desmarest, 1825; *Naesa bidentata* Templeton, 1836; *Naesa bidentata* Milne-Edwards, 1840; *Naesa bidentata* Bate and Westwood, 1868; *Naesa bidentata* Koehler, 1885; *Naesa bidentata* Carus, 1885; *Naesa bidentata* Stebbing, 1893; *Naesa bidentata* Tattersall, 1905; *Naesa bidentata* Naylor and Quenisset, 1964; *Dynamene montagui* Leach, 1818; *Dynamene montagui* Desmarest, 1825; *Dynamene montagui* Bate and Westwood, 1868; *Dynamene montagui* Stebbing, 1874; *Dynamene montagui* Norman and Scott, 1906; *Dynamene viridis* Leach, 1818; *Dynamene viridis* Desmarest, 1825; *Dynamene viridis* Bate and Westwood, 1868; *Dynamene rubra* Leach, 1818; *Dynamene rubra* Desmarest, 1825; *Dynamene rubra* Bate and Westwood, 1868; *Sphaeroma bidentata* Bosc, 1830; *Sphaeroma montagui* Bosc, 1830; *Campecoepa versicolor* Rathke, 1837; *Campecoepa bicolor* Rathke, 1837; *Cymodocea viridis* Milne-Edwards, 1840; *Cymodocea ruber* Milne-Edwards, 1840; *Cymodocea montagui* Milne-Edwards, 1840; *Cymodocea versicolor* Milne-Edwards, 1840; *Cymodocea rubra* White, 1847; *Cymodocea rubra* Cocks, 1849; *Cymodocea viridis* White, 1847; *Cymodocea viridis* Cocks, 1849; *Cymodocea montagui* White, 1847; *Cymodocea montagui* Cocks, 1849; *Naesa viridis* Hesse, 1872; *Naesea bidentata* Hesse, 1873; *Dynamene varians* Stebbing, 1874.
Material examined. Station 4, Sample 2.028: 3 juveniles.

Distribution. European and African Atlantic and Mediterranean. Widely registered from the Iberian waters, in the Atlantic littoral zone (Bolívar, 1892; Holdich, 1970; Anadón, 1975; Polo *et al.*, 1982; Junoy and Viéitez, 1988, 1990b, 1992; Lombas and Anadón, 1985; Arrontes and Anadón, 1990a,b; Arrontes, 1990, 1991, 1992; Viejo and Arrontes, 1992; Drake *et al.*, 1997) the Mediterranean (Bolívar, 1892); Margalef *et al.*, 1971; Carbonell, 1984; Castelló, 1986a, 1986b; Ros *et al.*, 1987) and the Balearic Islands (Castelló, 1986b).

Remarks. According to Holdich (1970, 1976), this species is restricted to the Atlantic, from Holland to northwest Africa; Mediterranean registers are erroneous and belong to other species in the genus. Although this is possible, especially if the specimens were determined from females or juveniles, Maggiore and Fresi (1984) registered this species from the gulf of Naples (male from port of Ischia). The registers from the eastern Spanish coast confirm its presence in the Mediterranean. The preferred habitat of this species are crevices and *Balanus* (Holdich, 1976). Nevertheless, we found it on *Dictyota*, at 0 m.

Dynamene edwardsi (Lucas, 1849)

Diagnosis. Lucas (1849): Explor. Sci. de l'Algérie, Zool. 1: 1-403.
Synonymies. *Naesea edwardsi* Lucas, 1849; *Naesea subviridiscutata* Hesse, 1873; *Dynamene hanseni* Monod, 1923.
Material examined. Station 14, Sample 1.013: 1 male, 1 female, 3 juveniles; St 14, Sp 1.002: 1 f, 3 j; St 14, Sp 2.038: 2 f; St 14, Sp 2.019: 1 m, 1 f; St 14, Sp 4.044: 3 f, 1 j; St 14, Sp 4.045: 2 f; St 14,

Sp 4.051: 3 m, 3 f, 11 j; St 14, Sp 4.052: 7 f, 1 j; St 14, Sp 4.053: 11 f, 1 j; St 14, Sp 4.054: 2 f; St 14, Sp 4.061: 1 m, 2 j; St 14, Sp 4.064: 2 m, 2 f; St 14, Sp 4.065: 3 f, 4 j; St 14, Sp 4.066: 1 f, 2 j; St 14, Sp 4.067: 1 j; St 14, Sp 4.068: 1 m, 1 f; St 14, Sp 4.069: 1 f, 1 j; St 14, Sp 4.070: 1 j; St 14, Sp 4.072: 1 j; St 14, Sp 4.073: 1 m, 6 f, 8 j; St 14, Sp 4.077: 6 f; St 14, Sp 4.078: 4 f, 5 j; St 14, Sp 4.079: 1 f; St 14, Sp 4.080: 1 f; St 14, Sp 4.081: 1 j; St 14, Sp 4.082: 1 m, 3 j; St 14, Sp 4.084: 2 m; St 14, Sp 4.085: 4 f, 2 j; St 14, Sp 4.087: 1 j; St 14, Sp 4.088: 4 f, 4 j; St 14, Sp 4.089: 2 m, 4 f, 2 j; St 14, Sp 4.090: 1 m, 9 f, 1 j; St 14, Sp 4.092: 4 m, 6 f; St 14, Sp 4.094: 2 f; St 14, Sp 4.096: 2 f, 4 j; St 14, Sp 4.097: 1 m, 1 f; St 14, Sp 4.098: 1 f; St 14, Sp 4.099: 1 j; St 16, Sp 2.026: 2 j; St 18, Sp 2.021: 1 j; St 18, Sp 4.112: 1 m; St 20, Sp 4.117: 1 m.

Distribution. European and African Atlantic littoral and Mediterranean. Registered from Catalonia and the Balearic Islands (Castelló, 1986a, 1986b).

Remarks. Castelló (1986a, 1986b) found it mostly on photophylle algae. In our study, it was collected on *Enteromorpha*, *Corallina*, *Jania*, *Ulothrix*, *Cystoseira*, *Asparagopsis* and *Peysonnelia*, between 0 and 8 m.

Dynamene magnitorata Holdich, 1968

Diagnosis. Holdich (1968): Pubbl. Staz. Zool. Napoli, 36: 401-426.
Synonymy. *Dynamene bidentata* Monod, 1932.
Material examined. Station 4, Sample 2.050: 5 females, 14 juveniles; St 4, Sp 1.005: 1 f, 3 j; St 4, Sp 2.027: 3 f, 8 j; St 4, Sp 2.036: 3 f, 1 j; St 4, Sp 2.040: 1 j; St 7, Sp 4.101: 1 male, 1 f; St 8, Sp 2.049: 1 m, 3 f; St 10, Sp 3.021: 1 f; St 11, Sp 4.093: 1 m, 2 f; St 13, Sp 4.048: 1 m; St 13, Sp 4.105: 1 j; St 14, Sp 2.045: 10 f, 1 j; St 14, Sp 4.044: 1 f, 1 j; St 15, Sp 4.103: 1 j; St 16, Sp 4.086: 1 m; St 18, Sp 2.018: 35 j; St 18, Sp 4.056: 3 f, 3 j; St 18, Sp 5.006: 7 j; St 20, Sp 4.117: 1 m; St 20, Sp 4.058: 2 f, 4 j; St 20, Sp 4.107: 1 m, 4 f, 2 j; St 27, Sp 4.108: 1 m, 12 f, 4 j; St 27, Sp 4.057: 1 m; St 31, Sp 4.115: 3 f, 2 j; St 31, Sp 4.116: 4 f, 2 j; St 31, Sp 5.007: 1 m, 2 f, 3 j.

Distribution. European and African Atlantic littoral zone and Mediterranean. Registered from the northern Iberian waters (Arrontes and Anadón, 1990a,b), Galicia (Holdich, 1968; Reboreda, 1995) and Balearic Islands (Castelló, 1986a, 1986b; Franch and Ballesteros, 1993).

Remarks. The preferred habitat are ascidians (*Dendrodoa*, *Didemnum*) or sponges (*Halichondria*, *Hymeniacion*) (Holdich, 1976). We located it on *Ircinia*. Castelló (1986b) located it in the Balearic Islands mainly on photophylle algae, as corroborated by this study (*Cystoseira*, *Dictyota*, *Taonia*, *Halopteris*, *Peysonnelia*, *Cladostephus*, *Halopitys*, *Padina*, *Sphaerococcus*, *Asparagopsis*, *Colpomenia*, *Phyllaria*, *Sargassum*), where it was collected at depths of 0-8 m.

Genus *Ischyromene* Racovitza, 1908
Ischyromene lacazei Racovitza, 1908

Diagnosis. Racovitza (1908): Arch. Zool. Exp. Gén. Paris, 4 série, 9: 60-64.
Material examined. Station 14, Sample 2.020: 1 female; St 14, Sp

1.001: 3 males, 2 f; St 14, Sp 2.033: 6 m, 5 f; St 14, Sp 2.037: 6 m, 22 f; St 14, Sp 2.039: 5 m, 13 f; St 14, Sp 3.017: 1 f; St 14, Sp 2.032: 1 m; St 14, Sp 3.006: 1 m; St 14, Sp 3.010: 1 m; St 14, Sp 3.015: 7 m, 1 f; St 14, Sp 3.016: 1 m; St 14, Sp 4.037: 3 f; St 14, Sp 4.038: 8 m, 11 f; St 14, Sp 4.044: 2 f, 2 juveniles; St 14, Sp 4.047: 1 f; St 14, Sp 4.054: 1 f; St 14, Sp 4.060: 2 f; St 14, Sp 4.062: 4 f; St 14, Sp 4.063: 1 j; St 14, Sp 4.071: 1 m, 1 f; St 14, Sp 4.072: 1 m, 3 f; St 14, Sp 4.073: 2 f; St 14, Sp 4.074: 6 f; St 14, Sp 4.075: 2 m, 5 f, 3 j; St 14, Sp 4.076: 7 f; St 14, Sp 4.079: 3 f, 1 j; St 14, Sp 4.082: 1 f; St 14, Sp 4.083: 3 m, 9 f; St 14, Sp 4.091: 1 m, 1 f, 27 j; St 14, Sp 4.095: 3 f; St 14, Sp 4.099: 1 f; St 14, Sp 4.100: 1 m; St 14, Sp 4.102: 2 f; St 14, Sp 4.104: 1 f; St 16, Sp 5.004: 1 m.

Distribution. Mediterranean and Atlantic Iberian coasts. Registered in the north of the Peninsula (Lombas and Anadón, 1985; Arrontes and Anadón, 1990a,b) and Galicia (Reboreda, 1995).

Remarks. The record from Tarifa is the southern-most limit for the species. It was collected from 1 to 2 m depth, on algae (*Enteromorpha*, *Ulva*, *Codium*, *Gelidium*, *Corallina* and *Asparagopsis*).

Genus *Lekanesphaera* Verhoeff, 1943

Lekanesphaera hookeri (Leach, 1814)

Diagnosis. Leach (1814): Brewster's Edinburgh Encyclopaedia, 7: 383-439.

Synonymies. *Sphaeroma hookeri* Leach, 1814; *Sphaeroma hookeri* Milne-Edwards, 1840; *Sphaeroma hookeri* White, 1957; *Sphaeroma hookeri* Bate and Westwood, 1886; *Sphaeroma hookeri* Holthuis, 1956; *Sphaeroma hookeri* Lejuez, 1962; *Sphaeroma hookeri* Naylor, 1972; *Sphaeroma hookeri* Rezig, 1976; *Sphaeroma hookeri* Kussakin, 1979; *Sphaeroma hookeri* Harrison and Holdich, 1984; *Sphaeroma hookeri* Castelló, 1986; *Sphaeroma fossarum* Von Martens, 1857; *Sphaeroma fossarum* Torelli, 1930; *Sphaeroma bolivarii* De Buen, 1888; *Sphaeroma bolivarii* Bolívar, 1893; *Sphaeroma rugicauda* Dollfus, 1899; *Sphaeroma rissoi* Seurat, 1924; *Exosphaeroma pulchellum* Colosi, 1921; *Sphaeroma pulchellum* Monod, 1931.

Material examined. Station 5, Sample 3.045: 4 males, 15 females; St 5, Sp 4.046: 6 m, 11 f; St 6, Sp 2.053: 1 f; St 6, Sp 2.055: 1 f; St 24, Sp 4.039: 2 m.

Distribution. European and African Atlantic coasts and Mediterranean. In the Iberian Peninsula it has been registered from the coasts of Galicia (Polo *et al.*, 1982; Jacobs, 1987; Reboreda, 1995), Atlantic coast of Andalusia (Drake *et al.*, 1997), Straits of Gibraltar (Jacobs, 1987) and the Mediterranean (De Buen, 1887; Bolívar, 1892; Gibert, 1919; Margalef, 1953; Chinchilla and Comín, 1977; Castelló, 1986b). The Atlantic specimens studied belong to the subspecies *L. hookeri hookeri* (Leach, 1814), which has an Atlantic distribution, and the Mediterranean specimens belong to the subspecies *L. hookeri sardoa* (Arcangeli, 1934), mainly distributed in the Mediterranean and southern Portugal.

Remarks. This species is typical of brackish waters (Castelló, 1986b), thus not uncommonly found in sediment in the estuaries of the Odiel, Guadalquivir and Guadarranque rivers.

Lekanesphaera levii (Argano and Ponticelli, 1981)

Diagnosis. Argano and Ponticelli (1981): Boll. Mus. Civ. Stor. Nat. Verona, 7: 227-234.

Synonymies. *Sphaeroma monodi* Bocquet, Hoestlandt and Levi, 1954; *Sphaeroma monodi* Lejuez, 1959; *Sphaeroma monodi* Daguerre de Hureaux *et al.*, 1960; *Sphaeroma monodi* Elkaim, 1966; *Sphaeroma monodi* Bocquet and Lejuez, 1967; *Sphaeroma monodi* Naylor, 1972.

Material examined. Station 4, Sample 2.017: 2 juveniles; St 4, Sp 2.036: 1 female; St 4, Sp 2.056: 1 male, 1 f, 33 j; St 9, Sp 2.044: 1 f; St 9, Sp 2.034: 1 m, 4 f, 2 j; St 9, Sp 4.036: 1 f.

Distribution. European Atlantic coasts and Mediterranean. In the Iberian Peninsula it has been registered on the Galician littoral zone (Viéitez, 1982; Penas and González, 1983; Planas, 1986; Jacobs, 1987; Junoy and Viéitez, 1988, 1990b, 1992; Mazé *et al.*, 1993; Reboreda, 1995), Atlantic Andalusian coast (Drake *et al.*, 1997) and the Mediterranean (Iborra and Ros, 1984; Ros *et al.*, 1987).

Remarks. The preferred habitat are crevices or rocks (Jacobs, 1987). Frequently found with *Sphaeroma serratum* (Fabricius, 1787), forming mixed populations (Jacobs, 1987). In our study, besides being collected on rocks, sediment and on *Zostera*, it was also commonly found on algae substrata (*Fucus*, *Taonia*, *Cystoseira*). Always found at 0 m.

Genus *Paracerceis* Hansen, 1905

Paracerceis sculpta (Holmes, 1904)

Diagnosis. Holmes (1904): Proc. California Acad. Sci., (3) Zoology, 3: 295-306.

Synonymy. *Dynamene sculpta* Holmes, 1904.

Material examined. Station 9, Sample 4.033: 1 female.

Distribution. North American Pacific and Atlantic coasts and Mediterranean. Registered from the Iberian Peninsula in the Bay of Cadiz (Rodríguez *et al.*, 1992; Drake *et al.*, 1997).

Remarks. The fact that Rodríguez *et al.* (1992) and our study mention it from the Bay of Cadiz, an area of port traffic, reinforces the idea that the species is passively transported (Forniz and Maggiore, 1985). It was collected in a sediment sample, at 0 m.

Genus *Paradella* Harrison and Holdich, 1982

Paradella diana (Menzies, 1962)

Diagnosis. Menzies (1962): Pacif. Natur., 3 (11): 337-348.

Synonymies. *Dynamenopsis diana* Menzies, 1962; *Dynamenopsis diana* Glynn, 1968; *Dynamenopsis diana* Schultz, 1969; *Dynamenella diana* Menzies and Glynn, 1968; *Dynamenella diana* Glynn, 1970; *Dynamenella diana* Iverson, 1974; *Dynamenella diana* Pires, 1980.

Material examined. Station 26, Sample 4.114: 1 male.

Distribution. North American Pacific and Atlantic coasts, Australia, Arabian Sea, and Mediterranean. In the Iberian Peninsula it was registered from the Bay of Cadiz (Rodríguez *et al.*, 1992; Drake *et al.*, 1997).

Remarks. In our study, it was registered from the Bay of Algeciras. As with *Paracerceis sculpta* (Holmes, 1904), its distribution seems linked to marine traffic, and is probably present in busy harbours. It was collected in sediment, at 0 m.

Genus *Sphaeroma* Bosc, 1802

Sphaeroma serratum (Fabricius, 1787)

Diagnosis. Fabricius (1787): Mantissa Insectorum, Hafniae, 1.

Synonymies. *Oniscus serratus* Fabricius, 1787; *Cymothoa serrata* Fabricius, 1793; *Cymothoa serrata* Leach, 1814; *Sphaeroma cinerea* Bosc, 1802; *Sphaeroma cinerea* Latreille, 1802; *Sphaeroma cinerea* Risso, 1816; *Sphaeroma cinerea* Audouin, 1826; *Sphaeroma siciliense* White, 1847; *Sphaeroma siciliense* Hansen, 1905; *Sphaeroma conglobator* Pallas, 1766; *Sphaeroma conglobator* Stebbing, 1910; *Sphaeroma adriaticum* Verhoeff, 1943; *Sphaeroma aenariense* Verhoeff, 1943; *Sphaeroma capreae* Verhoeff, 1943; *Sphaeroma foveolatum* Verhoeff, 1943; *Sphaeroma aegaeum* Verhoeff, 1949; *Sphaeroma dalmaticum* Verhoeff, 1949; *Sphaeroma illyricum* Verhoeff, 1949.

Material examined. Station 9, Sample 2.042: 4 males, 1 female; St 16, Sp 2.026: 2 f; St 16, Sp 4.113: 1 m.

Distribution. Practically cosmopolitan. In the Iberian waters, it has been widely registered, on the Atlantic littoral (Bolívar, 1892; Hoestlandt, 1956; Jacobs, 1987; Rallo *et al.*, 1987; Arrontes and Anadón, 1990a,b; San Vicente and Sorbe, 1993; García *et al.*, 1993; Reboreda, 1995), the Mediterranean (De Buen, 1916; Gibert, 1919; Margalef *et al.*, 1971; Carbonell, 1984; Iborra and Ros, 1984; Castelló, 1986a, 1986b; Jacobs, 1987; Ros *et al.*, 1987), and the Balearic Islands (Castelló, 1986a, 1986b).

Remarks. This is a superficial species that prefers to live under stones or in beaches with shell remains (Jacobs, 1987). Castelló (1986b) indicated that in Catalonia and the Balearic Islands it was frequently found associated to the epibiotic janirid *Jaera hopeana* Costa, 1853, which is a highly specific relationship. It was collected at 0-1 m, on rock samples.

Suborder CYMOTHOIDA Leach, 1814

Family CYMOTHOIDAE Leach, 1818

Genus *Anilocra* Leach, 1818

Anilocra frontalis Milne-Edwards, 1840

Diagnosis. Milne-Edwards (1840): Histoire Naturelle des Crustacés.

Synonymies. *Anilocra mediterranea* Norman, 1868; *Anilocra mediterranea* Koehler, 1885; *Anilocra mediterranea* Bonnier,

1887; *Anilocra mediterranea* Norman, 1907; *Anilocra asilus* Walker and Hornell, 1896; *Anilocra asilus* Zirwas, 1911; *Anilocra physodes* Norman, 1907; *Anilocra physodes* Zirwas, 1911; *Anilocra physodes* Nierstrasz, 1918; *Anilocra physodes* Monod, 1923; *Anilocra physodes* Legry, 1952.

Material examined. Station 3, Sample 2.051: 1 male.

Distribution. European Atlantic and Mediterranean. Registered from the southern Atlantic littoral of the Iberian Peninsula (Nieto and Alberto, 1993), the Andalusian Mediterranean littoral (Rodríguez-Sánchez *et al.*, in press) and the Balearic Islands (Schioedte and Meinert, 1881; Carus, 1885).

Remarks. Trilles (1975) indicated that this species lives as a parasite mainly on fish from the family Labridae, and to a lesser extent, on Gobiidae. In our study, the specimen was attached on *Liza* (Mugilidae).

Family CIROLANIDAE Dana, 1852

Genus *Cirolana* Leach, 1818

Cirolana cranchii Leach, 1818

Diagnosis. Leach (1818): In F. Cuvier. Dictionnaire des Sciences naturelles, 12.

Synonymy. *Conilera grampoides* Gourret, 1892.

Material examined. Station 14, Sample 2.032: 1 female.

Distribution. European and African Atlantic coasts, Mediterranean, southern Africa, Australia.

Remarks. This is the fourth record from the Iberian waters and helps confirm the results of Camiñas (1984), Cano and García (1987) and Rodríguez-Sánchez *et al.* (in press). Collected at 1 m.

Genus *Eurydice* Leach, 1815

Eurydice inermis Hansen, 1890

Diagnosis. Hansen (1890): Kgl. Danske Vidensk. Selskabs Skrifter, 6. Række, naturv. og mathem., 3: 239-426.

Material examined. Station 18, Sample 4.106: 1 female; St 30, Sp 4.049: 1 juvenile.

Distribution. Atlantic European coasts. This is the second register for the Iberian waters and the Mediterranean, confirming the data by Rodríguez-Sánchez *et al.* (in press).

Remarks. The posterior margin on the telson in both specimens has 7 teeth. Collected on sediment, between 12 and 21 m.

Genus *Natatolana* Bruce, 1981

Natatolana gallica (Hansen, 1905)

Diagnosis. Hansen (1905b): J. Linn. Soc., 29: 337-373.

Synonymy. *Cirolana gallica* Hansen, 1905.

Material examined. Station 20, Sample 4.111: 1 female.

Distribution. European and African Atlantic coasts. This is the first record from the Iberian waters and the Mediterranean.

Remarks. Hansen (1905b) only indicates that the external margin on the exopod has 2 or 3 setae and provides no information on the endopod. There are 3 short and robust spines on the apex of the endopod of the uropod in our specimen, 2 on the inner margin and 4 on the outer margin, among numerous setae. On the outer margin of the exopod there are 2 spines and 1 or 2 on its apex (the second one could be a broken seta). It was collected in sediment, at 8 m.

Family GNATHIIDAE Harger, 1880

Genus *Gnathia* Leach, 1814

Gnathia maxillaris (Montagu, 1804)

Diagnosis. Montagu (1804): Trans. Linn. Soc., 7: 61-85.

Synonymies. *Cancer maxillaris* Montagu, 1804; *Oniscus coeruleatus* Montagu, 1813; *Gnathia termitoides* Leach, 1813; *Anceus maxillaris* Lamarck, 1818; *Praniza coeruleata* Lamarck, 1818; *Praniza coeruleata* Desmarest, 1825; *Pranizus coeruleatus* Letreille, 1825; *Oniscus coeruleatus* Latreille, 1825; *Anceus maxillosus* Bosc, 1830; *Praniza fuscata* Johnston, 1832; *Praniza montagui* Westwood, 1832; *Anceus forficularis* Cocks, 1851; *Anceus manticorus* Hesse, 1864; *Anceus lupi* Hesse, 1864; *Anceus rapax* Hesse, 1864; *Anceus verrucosus* Hesse, 1864; *Anceus fuscata* Bate and Westwood, 1866; *Praniza flavus* Bate and Westwood, 1866; *Anceus balani* Gerstaecker, 1883; *Gnathia manticora* Brian, 1909; *Gnathia verrucosa* Brian, 1909; *Gnathia balani* Stephensen, 1915; *Gnathia fuscata* Stephensen, 1915; *Gnathia lupi* Stephensen, 1915.

Material examined. Station 14, Sample 1.011: 1 male; St 14, Sp 2.057: 1 m; St 27, Sp 4.014: 1 m.

Distribution. European Atlantic coast and Mediterranean. In the Iberian Peninsula it has been registered from the northern coasts (Bolívar, 1892; Lombas and Anadón, 1985; Arrontes and Anadón, 1990a,b), Galicia (Monod, 1926; Polo *et al.*, 1982; Reboreda, 1995), and Andalusia (Rodríguez-Sánchez *et al.* (in press)). Also registered from the Balearic Islands (Monod, 1926).

Remarks. Although it has not been registered, this species is very abundant in Catalonia (pers. obs.). The larvae are pelagic because they are haematophagous and they live as ectoparasites on fish. All the specimens in our study were adults and collected at 3 – 12 m in sediment and on *Ircinia*.

Suborder ONISCIDEA Latreille, 1803

Family LIGIIDAE Brandt and Ratzeburg, 1831

Genus *Ligia* Fabricius, 1798

Ligia oceanica (Linnaeus, 1767)

Diagnosis. Linnaeus (1767): Systema Naturae, ed. 12.

Synonymies. *Oniscus oceanicus* Linnaeus, 1767; *Ligia scopulorum* Leach, 1810; *Ligia granulata* Frey and Leuckart, 1847; *Ligia belgi-*

ca Ritzema-Bos, 1874.

Material examined. Station 14, Sample 3.018: 1 male, 1 female.

Distribution. This is the characteristic species of the Atlantic peninsular supralittoral. Vandel (1960) provides a distribution map covering the entire Atlantic peninsular littoral. Arrontes and Anadón (1990b) registered it from Asturias and Drake *et al.* (1997) from Cadiz Bay.

Remarks. Vandel (1960) circumscribes this species to the European Atlantic littoral zone, from Norway to the Moroccan Atlantic, and indicates that the records from Gibraltar and Malaga are incorrect. In our study, it is registered from Tarifa, the southern limit of the European Atlantic. In the southern Atlantic littoral of the Iberian Peninsula there is another species from this genus *Ligia italica* Fabricius, 1798, which has a fundamentally Mediterranean distribution. The two species are different in body shape, which is more robust in *Ligia oceanica* (Linnaeus, 1767), and in the number of articles on the antennal flagellum (11-14 in *L. oceanica* and 20-22 in *L. italica*).

Family TYLIDAE Milne-Edwards, 1840

Genus *Tylos* Audouin, 1826

Tylos europaeus Arcangeli, 1938

Diagnosis. Arcangeli (1938): Boll. Mus. Zool. Anat. Comp. Torino, 46: 139-151.

Synonymies. *Tylos latreillii europaeus* Arcangeli, 1938; *Tylos latreilli* Lucas, 1849; *Tylos sabuleti* Verhoeff, 1949.

Material examined. Station 9, Sample 2.041: 1 male, 8 females.

Distribution. Eastern European and African Atlantic coasts and Mediterranean. Registered on the Portuguese littoral (Dexter, 1990) and Spanish Mediterranean (Giordani-Soika, 1954).

Remarks. Although some authors agree that sand grain size does not condition the habitat of other species from this genus (Hayes, 1977; Kensley, 1974), Mead (1969) states that *T. europaeus* Arcangeli, 1938 is interstitial in fine sand beach, making its habitat different from that of *T. sardous* Arcangeli, 1938, which prefers coarse sand substrates.

DISCUSSION

The isopod fauna in the studied area is moderately rich (42 species, from 30 genera, 16 families, and 6 suborders), with a diversity comparable to the Galician littoral zone (39 species: Reboreda, 1995;

TABLE 2. – Material examined showing the sampling data.

Sample	Station	Date	Depth (m)	Ecological data	Species
4.031	1	30.12.91	8	No	<i>Janira maculosa</i>
4.043	2	30.12.91	8	No	<i>Janira maculosa</i>
2.051	3	17.03.88	1	<i>Liza</i>	<i>Anilocra frontalis</i>
2.050	4	17.02.91	0	<i>Taonia, Dictyota, Cystoseira</i>	<i>Dynamene magnitorata</i>
1.003	4	13.03.91	0	<i>Cystoseira</i>	<i>Idotea chelipes</i>
1.005	4	13.03.91	0	<i>Cystoseira</i>	<i>Dynamene magnitorata</i>
2.017	4	13.03.91	0	<i>Fucus</i>	<i>Lekanesphaera levii</i>
2.027	4	13.03.91	0	<i>Padina</i>	<i>Dynamene magnitorata</i>
2.028	4	13.03.91	0	<i>Dyctiota</i>	<i>Dynamene bidentata, Idotea chelipes</i>
2.036	4	13.03.91	0	<i>Taonia</i>	<i>Dynamene magnitorata, Lekanesphaera levii</i>
2.056	4	13.03.91	0	<i>Cystoseira</i>	<i>Lekanesphaera levii</i>
2.040	4	23.05.91	0	<i>Sargassum</i>	<i>Dynamene magnitorata</i>
2.058	5	13.02.91	0	<i>Cystoseira, Enteromorpha</i>	<i>Idotea chelipes</i>
2.054	5	13.03.91	0	<i>Cystoseira, Enteromorpha</i>	<i>Idotea chelipes</i>
2.059	5	13.03.91	0	<i>Cystoseira</i>	<i>Idotea chelipes</i>
3.045	5	20.03.92	0	Drift seaweeds	<i>Lekanesphaera hookeri</i>
4.046	5	29.11.91	0	Sediment	<i>Lekanesphaera hookeri</i>
2.053	6	30.11.90	0	No	<i>Lekanesphaera hookeri</i>
2.055	6	30.11.90	0	No	<i>Lekanesphaera hookeri</i>
4.101	7	02.08.91	4	<i>Peysonnellia</i>	<i>Dynamene magnitorata</i>
3.007	7	21.08.91	2	<i>Halopteris</i>	<i>Synisoma nadejda</i>
3.051	7	21.08.91	2	<i>Halopteris</i>	<i>Paranthura nigropunctata</i>
2.049	8	17.01.91	0	<i>Ircinia</i>	<i>Dynamene magnitorata</i>
1.007	9	09.11.90	1	Sediment	<i>Cyathura carinata</i>
2.035	9	09.11.90	0	Sediment	<i>Cyathura carinata</i>
2.044	9	09.11.90	1	Rocks	<i>Lekanesphaera levii</i>
2.041	9	18.03.91	1	Salt-marches	<i>Tylos europaeus</i>
2.042	9	18.03.91	1	Rocks	<i>Sphaeroma serratum</i>
1.004	9	19.03.91	1	<i>Zostera, Gracilaria</i>	<i>Idotea chelipes</i>
2.034	9	30.05.91	0	<i>Zostera</i>	<i>Lekanesphaera levii</i>
4.032	9	04.04.91	0	Sediment	<i>Cyathura carinata</i>
4.033	9	04.04.91	0	Sediment	<i>Cyathura carinata, Idotea chelipes, Paracerceis sculpta</i>
4.034	9	04.04.91	0	Sediment	<i>Idotea chelipes</i>
4.036	9	04.04.91	0	Sediment	<i>Lekanesphaera levii</i>
3.021	10	26.11.91	0	<i>Halopteris, Jania</i>	<i>Synisoma nadejda, Dynamene magnitorata</i>
5.002	10	26.11.91	0	<i>Halopteris, Codium</i>	<i>Cymodoce emarginata</i>
3.014	11	13.08.91	4	<i>Halopteris</i>	<i>Synisoma nadejda</i>
3.036	11	13.08.91	4	<i>Halopteris</i>	<i>Cymodoce truncata</i>
3.002	11	13.08.91	5	<i>Cladostephus, Taonia, Halopitys</i>	<i>Synisoma nadejda</i>
4.093	11	13.08.91	5	<i>Cladostephus, Taonia, Halopitys</i>	<i>Dynamene magnitorata</i>
4.118	12	04.07.92	12	<i>Dilophus, Udotea, Taonia</i>	<i>Paranthura nigropunctata</i>
5.003	12	04.07.92	12	<i>Halopteris</i>	<i>Cymodoce truncata, Uromunna petiti</i>
4.119	12	04.07.92	12	<i>Axinella</i>	<i>Janira maculosa</i>
3.022	13	13.08.91	5	<i>Halopteris</i>	<i>Synisoma nadejda</i>
3.005	13	15.08.91	3	<i>Halopteris</i>	<i>Synisoma nadejda</i>
3.013	13	15.08.91	4	<i>Sphaerococcus</i>	<i>Arcturella poorei</i>
3.025	13	15.08.91	4	<i>Sphaerococcus</i>	<i>Synisoma nadejda</i>
3.037	13	15.08.91	3	<i>Cymodocea</i>	<i>Cymodoce robusta</i>
4.048	13	15.08.91	3	<i>Padina</i>	<i>Cymodoce robusta, Dynamene magnitorata</i>
4.105	13	15.08.91	3	<i>Sphaerococcus</i>	<i>Dynamene magnitorata</i>
1.011	14	09.07.90	12	No	<i>Gnathia maxillaris</i>
2.023	14	09.07.90	12	No	<i>Stenetrium mediterraneum</i>
2.025	14	09.07.90	12	No	<i>Munna fabricii</i>
1.013	14	10.07.90	1	<i>Enteromorpha</i>	<i>Dynamene edwardsi</i>
2.020	14	10.07.90	1	<i>Enteromorpha, Ulva</i>	<i>Ischyromene lacazei</i>
2.022	14	08.08.90	2	No	<i>Janira maculosa</i>
1.010	14	09.02.91	3	<i>Asparagopsis</i>	<i>Paranthura nigropunctata</i>
2.045	14	09.02.91	3	<i>Asparagopsis</i>	<i>Cymodoce truncata, Dynamene magnitorata</i>
1.006	14	10.02.91	14	<i>Asparagopsis</i>	<i>Synisoma nadejda</i>
1.008	14	10.02.91	14	<i>Asparagopsis</i>	<i>Cymodoce tattersalli</i>
2.057	14	10.02.91	3	<i>Ircinia</i>	<i>Gnathia maxillaris</i>
1.001	14	02.05.91	1	<i>Codium</i>	<i>Ischyromene lacazei</i>
1.002	14	02.05.91	1	<i>Corallina, Jania</i>	<i>Dynamene edwardsi</i>
2.033	14	02.05.91	1	No	<i>Ischyromene lacazei</i>
2.037	14	02.05.91	2	<i>Gelidium, Corallina</i>	<i>Ischyromene lacazei</i>
2.038	14	02.05.91	1	<i>Ulothrix</i>	<i>Dynamene edwardsi</i>
2.039	14	02.05.91	1	<i>Gelidium</i>	<i>Ischyromene lacazei</i>
3.017	14	02.05.91	0	<i>Gelidium</i>	<i>Ischyromene lacazei</i>
2.016	14	19.06.91	1	<i>Cystoseira</i>	<i>Synisoma nadejda</i>
2.019	14	19.06.91	1	<i>Cystoseira</i>	<i>Dynamene edwardsi</i>
2.032	14	19.06.91	1	No	<i>Ischyromene lacazei, Cirolana cranchii</i>

TABLE 2. (Cont.) – Material examined showing the sampling data.

Sample	Station	Date	Depth (m)	Ecological data	Species
3.003	14	19.06.91	0	No	<i>Synisoma nadejda</i>
3.006	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
3.008	14	19.06.91	0	No	<i>Synisoma nadejda</i>
3.010	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
3.015	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
3.016	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
3.024	14	19.06.91	0	No	<i>Synisoma nadejda</i>
4.029	14	19.06.91	0	No	<i>Joeropsis brevicornis</i>
4.037	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.038	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.044	14	19.06.91	0	No	<i>Dynamene edwardsi</i> , <i>Dynamene magnitorata</i> , <i>Ischyromene lacazei</i>
4.045	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.047	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.051	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.052	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.053	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.054	14	19.06.91	2	<i>Asparagopsis</i>	<i>Dynamene edwardsi</i> , <i>Ischyromene lacazei</i>
4.055	14	19.06.91	2	<i>Asparagopsis</i>	<i>Campecopea hirsuta</i>
4.060	14	19.06.91	2	<i>Asparagopsis</i>	<i>Ischyromene lacazei</i>
4.061	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.062	14	19.06.91	2	<i>Asparagopsis</i>	<i>Ischyromene lacazei</i>
4.063	14	19.06.91	2	<i>Asparagopsis</i>	<i>Ischyromene lacazei</i>
4.064	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.065	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.066	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.067	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.068	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.069	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.070	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.071	14	19.06.91	2	No	<i>Ischyromene lacazei</i>
4.072	14	19.06.91	2	No	<i>Dynamene edwardsi</i> , <i>Ischyromene lacazei</i>
4.073	14	19.06.91	2	No	<i>Dynamene edwardsi</i> , <i>Ischyromene lacazei</i>
4.074	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.075	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.076	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.077	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.078	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.079	14	19.06.91	1	No	<i>Dynamene edwardsi</i> , <i>Ischyromene lacazei</i>
4.080	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.081	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.082	14	19.06.91	0	No	<i>Dynamene edwardsi</i> , <i>Ischyromene lacazei</i>
4.083	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.084	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.085	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.087	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.088	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.089	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.090	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.091	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.092	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.094	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.095	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.096	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.097	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.098	14	19.06.91	0	No	<i>Dynamene edwardsi</i>
4.099	14	19.06.91	0	No	<i>Dynamene edwardsi</i> , <i>Ischyromene lacazei</i>
4.100	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.102	14	19.06.91	0	No	<i>Ischyromene lacazei</i>
4.104	14	19.06.91	1	<i>Codium</i>	<i>Ischyromene lacazei</i>
4.120	14	21.06.91	3	<i>Reniera</i>	<i>Stellanthura cryptobia</i>
2.052	14	09.07.91	3	<i>Asparagopsis</i>	<i>Synisoma nadejda</i>
3.018	14	24.08.91	0	Overhang	<i>Ligia oceanica</i>
3.030	15	20.08.91	8	No	<i>Cymodoce truncata</i>
3.058	15	20.08.91	8	<i>Halopteris</i>	<i>Paranthura nigropunctata</i>
4.021	15	20.08.91	8	No	<i>Janira maculosa</i>
4.103	15	20.08.91	8	No	<i>Dynamene magnitorata</i>
4.041	15	21.08.91	8	No	<i>Cymodoce truncata</i>
4.086	16	19.03.91	6	<i>Colpomenia</i>	<i>Dynamene magnitorata</i>
2.026	16	12.05.91	0	No	<i>Sphaeroma serratum</i> , <i>Dynamene edwardsi</i>
2.047	16	12.05.91	0	No	<i>Campecopea hirsuta</i>
5.004	16	25.07.91	0	No	<i>Ischyromene lacazei</i>

TABLE 2. (Cont.) – Material examined showing the sampling data.

Sample	Station	Date	Depth (m)	Ecological data	Species
4.113	16	01.08.91	0	No	<i>Sphaeroma serratum</i>
3.054	16	19.08.91	0	Sediment	<i>Paranthura nigropunctata</i>
4.007	16	19.08.91	0	No	<i>Janira maculosa</i>
4.040	16	11.09.91	18	Sediment	<i>Cymodoce truncata</i>
3.060	17	07.06.91	10	Sediment	<i>Monodanthurus maroccana</i>
3.012	17	06.08.91	12	No	<i>Astacilla mediterranea</i>
4.009	17	06.08.91	13	No	<i>Janira maculosa</i>
4.035	17	06.08.91	12	No	<i>Janira maculosa</i> , <i>Munna fabricii</i>
5.005	17	15.04.92	9	No	<i>Anthura gracilis</i>
1.012	18	25.07.90	2		<i>Gelidium</i> <i>Joeropsis brevicornis</i>
5.006	18	23.02.91	3		<i>Halopteris</i> <i>Cymodoce truncata</i> , <i>Dynamene magnitorata</i>
1.009	18	28.02.91	3		<i>Halopteris</i> <i>Cymodoce truncata</i>
2.018	18	28.02.91	5		<i>Halopteris</i> <i>Cymodoce truncata</i> , <i>Dynamene magnitorata</i> <i>Paranthura costana</i>
2.021	18	28.02.91	2	<i>Peysonnellia</i>	<i>Janira maculosa</i> , <i>Dynamene edwardsi</i>
2.043	18	28.02.91	5	<i>Halopteris</i>	<i>Uromunna petiti</i>
4.013	18	12.07.91	9	<i>Ircinia</i>	<i>Janira maculosa</i>
4.027	18	12.07.91	4	<i>Mesophyllum</i>	<i>Janira maculosa</i>
4.024	18	17.07.91	4	<i>Mesophyllum</i>	<i>Janira maculosa</i>
3.011	18	20.07.91	3	<i>Padina</i>	<i>Astacilla mediterranea</i>
3.026	18	21.07.91	20	No	<i>Cymodoce truncata</i>
4.020	18	21.07.91	20	No	<i>Janira maculosa</i>
4.056	18	30.07.91	3	<i>Colpomenia</i>	<i>Dynamene magnitorata</i>
4.106	18	03.09.91	21	Sediment	<i>Eurydice inermis</i>
4.112	18	08.07.92	8	No	<i>Dynamene edwardsi</i>
3.048	19	17.07.91	4	No	<i>Paranthura nigropunctata</i>
4.006	19	30.08.91	6	No	<i>Janira maculosa</i>
3.028	19	30.08.91	6	Sediment	<i>Cymodoce truncata</i>
3.044	19	30.08.91	6	No	<i>Cymodoce tattersalli</i>
3.052	19	30.08.91	6	No	<i>Anthura gracilis</i>
3.043	19	12.09.91	6	No	<i>Cymodoce tattersalli</i>
3.073	19	12.09.91	6	No	<i>Paranthura nigropunctata</i>
2.015	20	06.07.90	3	No	<i>Cymodoce tattersalli</i>
4.117	20	06.07.90	3	No	<i>Dynamene edwardsi</i> , <i>Dynamene magnitorata</i>
3.019	20	23.07.91	9	<i>Sphaerococcus</i>	<i>Astacilla cingulata</i> , <i>Astacilla mediterranea</i> <i>Astacilla paucisaetosa</i>
3.020	20	23.07.91	9	<i>Sphaerococcus</i>	<i>Astacilla mediterranea</i>
3.023	20	23.07.91	9	No	<i>Astacilla mediterranea</i>
3.059	20	25.07.91	4	No	<i>Anthura gracilis</i> , <i>Paranthura nigropunctata</i>
4.025	20	25.07.91	4	No	<i>Janira maculosa</i>
4.058	20	29.07.91	3	<i>Phyllaria</i>	<i>Dynamene magnitorata</i>
4.107	20	29.07.91	3	<i>Dictyota</i>	<i>Dynamene magnitorata</i>
3.029	20	01.08.91	16	Sediment	<i>Cymodoce tattersalli</i>
3.056	20	01.08.91	16	No	<i>Anthura gracilis</i>
4.111	20	06.08.91	8	Sediment	<i>Natatolana gallica</i>
3.057	20	26.08.91	15	No	<i>Anthura gracilis</i>
4.022	20	26.08.91	15	No	<i>Janira maculosa</i>
4.004	20	01.08.91	16	<i>Mesophyllum</i>	<i>Janira maculosa</i>
4.003	20	01.09.91	16	No	<i>Janira maculosa</i>
4.008	21	14.08.91	26	Rocks	<i>Janira maculosa</i>
3.050	22	05.09.91	3	Sediment	<i>Cyathura carinata</i>
3.053	22	05.09.91	4	Sediment	<i>Cymodoce truncata</i>
3.061	22	05.09.91	3	Sediment	<i>Cyathura carinata</i>
3.065	22	05.09.91	1	Sediment	<i>Cyathura carinata</i>
3.066	22	05.09.91	2	Sediment	<i>Cyathura carinata</i>
3.069	22	05.09.91	1	Sediment	<i>Cyathura carinata</i>
3.070	22	05.09.91	3	Sediment	<i>Cyathura carinata</i>
3.074	22	05.09.91	1	Sediment	<i>Cyathura carinata</i>
4.012	23	11.06.91	12	No	<i>Janira maculosa</i>
3.046	24	06.09.91	3	Sediment	<i>Cyathura carinata</i>
3.047	24	06.09.91	1	Sediment	<i>Cyathura carinata</i>
3.062	24	06.09.91	4	Sediment	<i>Cyathura carinata</i>
3.063	24	06.09.91	1	Sediment	<i>Cyathura carinata</i>
3.064	24	06.09.91	2	Sediment	<i>Cyathura carinata</i>
3.071	24	06.09.91	2	Sediment	<i>Cyathura carinata</i>
4.039	24	06.09.91	1	Sediment	<i>Lekanesphaera hookeri</i>
3.072	25	06.09.91	3	Sediment	<i>Monodanthurus maroccana</i>
4.015	26	12.07.91	17	Polychaete tubes	<i>Janira maculosa</i>
4.017	26	12.07.91	6	Rocks	<i>Janira maculosa</i>
4.042	26	12.07.91	17	Polychaete tubes	<i>Janira maculosa</i>
4.026	26	03.09.91	27	Sediment	<i>Janira maculosa</i>
4.114	26	22.04.92	0	Sediment	<i>Paradella dianae</i>

TABLE 2. (Cont.) – Material examined showing the sampling data.

Sample	Station	Date	Depth (m)	Ecological data	Species
2.048	27	21.07.90	22	Sediment	<i>Cymodoce rubropunctata</i>
2.024	27	01.05.91	22	<i>Marthasterias</i>	<i>Janira maculosa</i>
4.014	27	02.07.91	7	Sediment	<i>Gnathia maxillaris</i>
3.035	27	09.07.91	4	Sediment	<i>Cymodoce tattersalli</i>
3.004	27	26.07.91	4	<i>Halopteris</i>	<i>Astacilla mediterranea</i>
3.055	27	26.07.91	4	<i>Halopteris</i>	<i>Paranthura nigropunctata</i>
4.109	27	26.07.91	4	No	<i>Anthura gracilis</i>
3.067	27	02.08.91	27	<i>Eunicella</i>	<i>Stellanthura cryptobia</i>
4.001	27	02.08.91	27	No	<i>Janira maculosa</i>
4.002	27	02.08.91	27	<i>Codium</i>	<i>Janira maculosa</i>
3.040	27	18.08.91	0	<i>Colpomenia</i>	<i>Cymodoce truncata</i>
4.005	27	18.08.91	5	<i>Colpomenia</i>	<i>Janira maculosa</i>
4.108	27	24.08.91	6	<i>Cladostephus</i>	<i>Dynamene magnitorata</i>
3.001	27	29.08.91	6	No	<i>Cleantis prismatica</i>
3.027	27	29.08.91	6	<i>Cladostephus</i>	<i>Cymodoce truncata</i>
3.031	27	29.08.91	6	No	<i>Cymodoce tattersalli</i>
3.032	27	29.08.91	6	No	<i>Cymodoce truncata</i>
3.033	27	29.08.91	6	<i>Halopteris</i>	<i>Cymodoce truncata</i>
3.034	27	29.08.91	6	<i>Colpomenia</i>	<i>Cymodoce truncata</i>
3.049	27	29.08.91	6	<i>Cladostephus</i>	<i>Paranthura nigropunctata</i>
4.057	27	29.08.91	6	No	<i>Dynamene magnitorata</i>
3.068	27	02.09.91	27	No	<i>Paranthura nigropunctata</i>
4.030	27	02.09.91	27	No	<i>Janira maculosa</i>
4.110	27	06.06.92	20	No	<i>Cymodoce truncata</i>
4.059	28	04.07.91	3	<i>Caulerpa</i>	<i>Cymodoce truncata</i>
4.010	28	18.07.91	3	No	<i>Janira maculosa</i>
4.023	28	18.07.91	5	No	<i>Janira maculosa</i>
4.028	28	18.07.91	5	No	<i>Janira maculosa</i>
3.042	28	11.08.91	5	Sediment	<i>Cymodoce truncata</i>
3.038	28	24.08.91	6	<i>Microcosmus</i>	<i>Cymodoce tattersalli</i>
3.039	28	24.08.91	6	<i>Microcosmus</i>	<i>Cymodoce rubropunctata</i>
4.011	28	24.08.91	6	No	<i>Janira maculosa</i>
4.016	28	24.08.91	6	No	<i>Janira maculosa</i>
4.018	29	18.06.91	10	No	<i>Janira maculosa</i>
3.009	29	03.07.91	15	Sediment	<i>Idotea metallica</i>
5.001	29	22.04.92	28	<i>Halopteris</i>	<i>Arcturella damnoniensis</i>
4.049	30	10.09.91	12	No	<i>Eurydice inermis</i>
4.115	31	12.07.92	3	<i>Cystoseira</i>	<i>Dynamene magnitorata</i> , <i>Paranthura nigropunctata</i>
4.116	31	12.07.92	3	<i>Sargassum</i>	<i>Cymodoce truncata</i> , <i>Dynamene magnitorata</i> <i>Munna fabricii</i> , <i>Paranthura nigropunctata</i>
5.007	31	12.07.92	3	<i>Asparagopsis</i>	<i>Dynamene magnitorata</i> , <i>Janira maculosa</i>
5.008	31	12.07.92	3	<i>Jania</i>	<i>Cymodoce tattersalli</i> , <i>Paranthura nigropunctata</i> <i>Synisoma nadejda</i>

Reboreda and Urgorri, 1995), and slightly higher than the areas of Asturias (31 species: Arrontes and Anadón, 1990a,b) and Catalonia and the Balearic Islands (32 species: Castelló, 1986b). The results by Rodríguez-Sánchez *et al.* (in press) point to 58 species captured at depths between 12 and 860 m; we found only 28 of them in samples from less than 44 m.

Table 2 indicates that sampling was most intense between 0 and 12 m (89.3% of total samples), so the number of samples captured at this interval is proportionately larger than the rest. The same occurs with the number of species.

The percentages of species collected, by suborders, are: Asellota, 11.9%; Anthuridea, 14.3%; Valvifera, 21.4%; Sphaeromatidea, 35.7%; Cymothoidea, 11.9%; Oniscidea, 4.8%.

Taxonomically, the most diverse genera are *Astacilla* (3 species: *A. cingulata*, *A. mediterranea*,

A. paucisaetosa), *Cymodoce* (5 species: *C. emarginata*, *C. robusta*, *C. rubropunctata*, *C. tattersalli*, *C. truncata*) and *Dynamene* (3 species: *D. bidentata*, *D. edwardsi*, *D. magnitorata*).

Regarding substrate preferences (Table 2), 16 species were found in sediment, and *Cyathura carinata* was characteristic of this type of habitat, as found by Sola and Arzubialde (1993) in the Bidasoa estuary (Bay of Biscay). The dominant algae substrata were *Halopteris* (9 species collected on it; *Synisoma nadejda* and *Cymodoce truncata* were dominant), *Asparagopsis* (9 species; most characteristic was *Ischyromene lacazei*), and *Cystoseira* (6 species; *Idotea chelipes* and *Dynamene magnitorata* were most abundant). *Idotea chelipes* and *Lekanesphaera levii* were found on *Zostera*. Some species were registered as epibiotic on other animal species, especially sponges; in this sense, *Janira maculosa*,

Dynamene magnitorata and *Gnathia maxillaris* were found on *Ircinia*, and *Stellanthura cryptobia* was found on *Reniera* and *Eunicella*. *Cymodoce rubropunctata* and *Cymodoce tattersalli* were also found on *Microcosmus*.

By taxonomic group, the Asellota prefer algae substrates, except for *Janira maculosa*, which is also epibiotic on other organisms. The Anthuridea species were found exclusively on soft bottoms, except for the two *Paranthura* species (*P. costana* was captured on a sample of *Halopteris*, and *P. nigropunctata* was found on a great variety of algae substrates). The Valvifera are typical of algae communities, especially on *Sphaerococcus* or *Halopteris*. There were 3 genera of Sphaeromatidea (*Cymodoce*, *Dynamene*, *Ischyromene*) clearly related to this same habitat, while the other 4 genera (*Lekanesphaera*, *Paracerceis*, *Paradella*, *Sphaeroma*) prefer sedimentary bottoms. Within the Cymothoidea, both the Cirolanidae and the adult Gnathiidae also show a preference for this habitat. The few samples of Oniscidea were collected at their usual habitat (*Ligia oceanica* in small caves and *Tylos europaeus* in marsh sediment).

On the other hand, regarding bathymetry (Table 2), 18 species were found at 0 m. One of them (*Ligia oceanica*) is characteristic of the supralittoral floor and the other 17 species are from the mid-littoral floor, with *Dynamene edwardsi* and *Ischyromene lacazei* as most dominant. In the infralittoral, 33 species were found at 1-10 m, mostly *Janira maculosa*, *Dynamene magnitorata*, *Cymodoce truncata*, *Ischyromene lacazei* and *Cyathura carinata*; 13 species were found at a level of 11-20 m, mostly *Janira maculosa*. Finally, 6 species were present at 21-28 m, with *Janira maculosa* also most dominant.

Regarding bathymetric distribution, the Asellota species were not found below 12 m, except for *Janira maculosa* found near the sampling depth limit (27 m). Most of the Anthuridea were collected between 0 and 5 m, although some like *Stellanthura cryptobia* and *Paranthura nigropunctata* were also found as deep as 27 m. The Valvifera species were generally collected between 3 and 15 m, except for *Idotea chelipes* (0-1 m) and *Arcturella damnoniensis* (28 m). *Synisoma nadejda* was found mostly between 0 and 14 m. The Sphaeromatidea species are typically intertidal and infralittoral, but some reach greater depths (*Cymodoce rubropunctata*, up to 22 m, *C. tattersalli*, up to 16 m, and *C. truncata*, up to 20 m). The Cymothoidea

were captured at depths between 1 and 21 m, and the species found at the greatest depth was *Eurydice inermis*. The Oniscidea are typical of the supralittoral and intertidal zone.

From a biogeographical point of view the Strait of Gibraltar is a transit area for species. In this sense, it is important to note that *Munna fabricii*, *Monodanthurus maroccana*, *Campecopea hirsuta* and *Natanolana gallica* were registered during our study in the Mediterranean for the first time (Table 3), when their distribution was heretofore restricted to the Atlantic. On the contrary, *Synisoma nadejda* and *Uromunna petiti* were registered for the first time on the Atlantic littoral. Some species were registered for the first time from the Iberian waters: *Munna fabricii*, *Uromunna petiti*, *Monodanthurus maroccana*, *Stellanthura cryptobia* and *Natanolana gallica* (Table 3). Species new to science were described from samples in this collection, such as *Arcturella poorei* (Castelló, 1997), *Astacilla cingulata* and *Astacilla paucisaetosa* (Castelló and Carballo, 2000), thus constituting the first records for the Iberian fauna, the first one from the Atlantic littoral and the other two from the Mediterranean.

Perhaps because it has been sampled more intensively the location with the greatest species diversity (16; *Dynamene edwardsi* and *Ischyromene lacazei* are heavily dominant) is Tarifa (station 14), which can be considered a boundary between the Atlantic Ocean and the Mediterranean Sea. Some species from this location include *Joeropsis brevicornis*, *Stenetrium mediterraneum*, and *Stellanthura cryptobia*, with a Mediterranean distribution, thus they probably are already introduced in the Atlantic Ocean. Conversely, *Ligia oceanica* was also found here, a species from the Atlantic littoral (Table 3). *Paradella diana* and *Paracerceis sculpta*, already registered from the Mediterranean and the Straits of Gibraltar, were registered in this study from the Bays of Algeciras and Cadiz, respectively, which are areas of heavy port traffic, and the presence of those species is thus explained as they are passively transported on ship hulls (Rodríguez *et al.*, 1992).

It is currently well established that the connection between the Mediterranean and the Atlantic was interrupted as a consequence of the Euroasian and African plates coming together at the end of the Miocene, approximately 8 or 9 million years ago (Maldonado, 1989). The Mediterranean was subsequently transformed into a series of great

TABLE 3. – Presence of species in this study in the Atlantic Ocean, Mediterranean Sea and Iberian Peninsula (P, previously cited; S, found in the present study; (*) including Balearic Islands).

Taxa	Species	Atlantic Ocean	Tarifa	Mediterranean Sea	Iberian Peninsula*
Suborder ASELOTTA					
Superfamily JANIROIDEA					
Family Janiridae	<i>Janira maculosa</i>	P, S	P, S	P, S	P, S
Family Joeropsidae	<i>Joeropsis brevicornis</i>	P	S	P, S	P, S
Family Munnidae	<i>Munna fabricii</i>	P	S	S	S
	<i>Uromunna petiti</i>	S		P, S	
Superfamily STENETRIOIDEA					
Family Stenetriidae	<i>Stenetrium mediterraneum</i>		S	P	P, S
Suborder ANTHURIDEA					
Family Anthuridae	<i>Anthura gracilis</i>	P	P	P, S	P, S
	<i>Cyathura carinata</i>	P, S	P	P, S	P, S
	<i>Monodanthuria maroccana</i>	P		S	S
Family Hyssuridae	<i>Stellanthuria cryptobia</i>		S	P, S	S
Family Paranthuridae	<i>Paranthura costana</i>	P		P, S	P, S
	<i>Paranthura nigropunctata</i>	P, S	P, S	P, S	P, S
Suborder VALVIFERA					
Family Arcturidae	<i>Arcturella damnoniensis</i>	P		P, S	P, S
	<i>Arcturella poorei</i>	P			P
	<i>Astacilla cingulata</i>			P	P
	<i>Astacilla mediterranea</i>	P		P, S	P, S
	<i>Astacilla paucisaetosa</i>			P	P
Family Holognathidae	<i>Cleantis prismatica</i>	P		P, S	P, S
Family Idoteidae	<i>Idotea chelipes</i>	P, S		P	P, S
	<i>Idotea metallica</i>	P		P, S	P, S
	<i>Synisoma nadejda</i>	S	P, S	P	P, S
Suborder SPHAEROMATIDEA					
Family Sphaeromatidae	<i>Campecopea hirsuta</i>	P	S	S	P, S
	<i>Cymodoce emarginata</i>	P, S		P	P, S
	<i>Cymodoce robusta</i>	P, S	P		P, S
	<i>Cymodoce rubropunctata</i>	P	P	P, S	P, S
	<i>Cymodoce tattersalli</i>	P	S	P, S	P, S
	<i>Cymodoce truncata</i>	P, S	P, S	P, S	P, S
	<i>Dynamene bidentata</i>	P, S		P	P, S
	<i>Dynamene edwardsi</i>	P	S	P, S	P, S
	<i>Dynamene magnitorata</i>	P, S	S	P, S	P, S
	<i>Ischyromene lacazei</i>	P	S	P	P, S
	<i>Lekanesphaera hookeri</i>	P, S		P, S	P, S
	<i>Lekanesphaera levii</i>	P, S		P	P, S
	<i>Paracerceis sculpta</i>	P, S		P	P, S
	<i>Paradella dianae</i>	P		P, S	P, S
	<i>Sphaeroma serratum</i>	P, S		P, S	P, S
Suborder CYMOTHOIDA					
Family Cymothoidae	<i>Anilocra frontalis</i>	P, S		P	P, S
Family Cirolanidae	<i>Cirolana cranchii</i>	P	P, S	P	P, S
	<i>Eurydice inermis</i>	P	P	P, S	P, S
	<i>Natatolana gallica</i>	P		S	S
Family Gnathiidae	<i>Gnathia maxillaris</i>	P	S	P, S	P, S
Suborder ONISCIDEA					
Family Ligiidae	<i>Ligia oceanica</i>	P	S		P, S
Family Tylidae	<i>Tylos europaeus</i>	P, S		P	P, S

lakes, into which great quantities of salts precipitated, thus extinguishing practically all the marine benthic species, except possibly for those that remained in those small areas that received water from rivers. This period is known as the “Messinian salinity crisis”, which ended about 5 million years ago with the opening of the Straits of Gibraltar and the consequent flow of Atlantic waters that filled the Mediterranean, at the beginning of the Pliocene (Pérès, 1989). The Straits of Gibraltar is a very important geographic-geological formation which separates the Atlantic from the Mediter-

anean. It is located between very different marine environments and constitutes an extremely interesting faunistic enclave due to its special location between the Mediterranean Sea and the Atlantic Ocean. Study of its marine fauna can help define the limits of distribution for species endemic to the Mediterranean, or for Atlantic species which have not penetrated into the Mediterranean as has been demonstrated with others important benthic groups such as sponges (Carballo *et al.*, 1996) or ascidians (Naranjo *et al.*, 1998). The present study is a new contribution to this knowledge.

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