CRUSTACEA DECAPODA (EXCL. SERGESTIDAE) FROM IBERO-MOROCCAN WATERS. RESULTS OF BALGIM-84 EXPEDITION

José Enrique García Raso

ABSTRACT

During the Balgim-84 Expedition, carried out from both sides of the Straits of Gibraltar (Atlantic Ocean: Gulf of Cadiz and Mediterranean Sea: Alboran Sea), in depths between 137 and 2,142 m, 3,559 specimens of decapods belonging to 122 species were captured. Many of these species are rare, of biogeographical interest and represent new records for the area. For some species, anatomical details are given. A specimen of Plesionika may be a new species. The collection of Calocarides coronatus, Sympagurus acinos, Monodaeus guinotae, Periclimenes karini, Alpheus talismani, Athanas amazone, Merhippolyte ancirosta, Eualus cf. lebourae, Plesionika williamsi, Pontophilus cf. abyssi, Spongicoloides evolutus, Spongicoloides profundus, Odontozona edwardsi, Catapaguroidea iris and Strobopagurus gracilipes, among others, represents new records for the Mediterranean Sea, eastern Atlantic, and Iberian waters.

Deep fauna studies from the southern part of Spain and the northern coast of Morocco, Gulf of Cadiz and Alboran Sea, have been undertaken by large expeditions using such research ships as: HIRONDELLE (years 1886, 1887, 1888); PRINCESSE-ALICE (1885–1915) (Milne Edwards and Bouvier, 1894, 1899; Bouvier, 1908, 1917, 1922; Hansen, 1922); the TRAVAILLEUR (1880–1882); TALISMAN (1883) (Milne Edwards and Bouvier, 1900; Hansen, 1927); THOR (1908–1910) (Stephensen, 1923); M. SARS (1910) (Silvertsen and Holthuis, 1956; Sund, 1920); FAIAL (1957) (Nunes-Ruivo, 1961); PRESIDENTE THÉODORE-TISSIER (1957–1960) and THALASSA (1960–1961) (Maurin, 1961, 1962, 1965); CALYPSO (1958) (Péres, 1962); ATLANTIS II (1969) and THOR (1908–1910) (Casanova and Judkins, 1977; Casanova, 1977). Other expeditions were made by the THALASSA (1966–1968) (Casanova, 1977); METEOR (Türkay, 1976) and GARCÍA DEL CID (Exp. Fauna I, Templado et al., 1993).

Other less extensive expeditions or local studies, conducted to analyse the fauna of the Gulf of Cadiz and Alboran Sea were “Golfo de Cadiz 81 Expedition” (Sardá, et al., 1982), XAÜEN (1965, 1966) (Massuti, 1967), MÁLAGA 775 (1975) (Crespo, et al., 1976) and the I.E.O. expeditions to study the red coral bottoms of the Alboran Sea (García Raso, 1989), the studies of Miranda y Rivera (1933), Ribeiro-Cascalho (1987), García Raso (1981, 1982, 1984a, 1984b, 1985), and others.

A general review of some groups of decapods (Natantia and Macrura Reptantia) from the Moroccan littoral zone were made by Lagardère (1971) and Beaubrun (1978), and previously Zariquey (1968) published the Iberian Decapods.

All the above cited and other littoral studies have provided a great deal of information of the decapod fauna of this interesting geographical zone, in which a strong dynamic water-mass exists (Madélain, 1970; Huang and Stanley, 1972; Lanoix, 1974; Cano andGil, 1984; Parrilla and Kinder, 1987; Almazan et al., 1989). In 1977, Casanova studied the deep pelagic fauna.

Hydrodynamic processes play an important role in the transport and biological exchange between the Atlantic Ocean and the Mediterranean Sea, while the Strait of Gibraltar exhibit a boundary effect. However, the knowledge of the compara-
tive fauna between both “basins” (Alboran and Gulf of Cadiz), the importance of the Straits of Gibraltar as a boundary, and the influence of the water fluxes in the faunistic distribution and composition, are topics that have been poorly analyzed.

The objective of the present paper is to extend the knowledge of decapods, mainly the deep fauna, on both sides of the Straits of Gibraltar. Moreover, it provides us data to establish faunistic affinities and, in part, the influence of water mass circulation on the benthic species distribution.

The pelagic Family Sergestidae has been excluded, but it is the best known decapod group in the analyzed area, both faunistically and biogeographically (including its dynamics through the Straits of Gibraltar) (Abbes and Casanova, 1973; Casanova, 1977; Casanova and Judkins, 1977; Lagardère, 1978). In the Ibero-Moroccan area (At) and Alboran Sea (AL), 13 species belonging to this family have been cited: Sergestes arcticus Kröyer, 1855 (At-Al); Sergestes vigilax Stimpson, 1860 (At-Al); Sergestes henseni (Ortmann, 1893) (At-Al); Sergestes sargassi Ortmann, 1893 (At-Al); Sergestes atlanticus H. Milne Edwards, 1830 (At); Sergestes armatus Kröyer, 1855 (At); Sergestes pectinatus Sund, 1920 (At); Sergia crassus Hansen, 1922 (=S. splendens Sund, 1920) (At); Sergia robustus (Smith, 1882) (At-Al); Sergia japonicus Bate, 1881 (Al); Sergia tenuiremis Kröyer, 1885 (At); Sergia grandis (Sund, 1920) (At) and Petalidium obesum (Kröyer, 1859) (At).

MATERIAL AND METHODS

The specimens were collected in May–June 1984 by N. O. Cryos during the Balgim Expedition, which was organized by C.N.R.S (PIROCEAN) under the direction of Dr. E Bouchet (Muséum National d’Histoire Naturelle, Paris).

Four different collecting methods were used: beam-trawl (CP), rock dredge (DR), Waren’s epi-benthic sledge (DW) and “carottiel Usnel” (KG), but only the three first, and mainly the first two, were useful for collecting decapods.

The measurements used in size determination were: in Macrura, the dorsal maximum carapace length, without including the rostrum; in Paguridae, the maximum cephalothoracic shield length and, in Brachyura, the maximum carapace width (less in some species, in which the maximum carapace length, without including the rostrum, were selected).

The study area is located in the Alboran Sea (Mediterranean Sea) and Gulf of Cadiz (Atlantic Ocean), between 33°45,4’N (off Casablanca) to 36°55’N (off Cabo San Vicente) and 9°31,4’W to 3°03,3’W, and between 137 to 2,142 m in depth. Table 1 shows that 155 stations were established, but only 153 were valid (32 in the Alboran Sea and the rest in the Gulf of Cadiz).

RESULTS

The collection totalled 3,559 specimens belonging to 122 species and 36 families. All this material has been deposited in the collection of the Muséum National d’Histoire Naturelle of Paris.

Checklist of Species Taken and Station Data.—In the following checklist, for each species collected, the sampling station, depth in meter (m) and the number of specimens caught (e) are given. The maximum size and the size of the smallest ovigerous female are also shown. The uncertain or doubtful specimens (because they are: in bad conditions, very small or a possible contamination) are indicated with ?.

Family Oplophoridae

Acanthephyra pelagica (Risso, 1816). Examined material: CP-65, 1,805 m, 1e; CP-97, 1,498–1,532 m, 1e; CP-119, 483–551 m, 1e; CP-123, 1,230–1,238 m, 1e; CP-140, 1,734–1,742 m, 1e. Maximum carapace length, without rostrum, 23 mm.

Acanthephyra eximia Smith, 1884. Examined material: CP-14, 1,313–1,324 m, 2e; CP-63, 1,488–
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<th>Nat. bott.</th>
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<td>Foram. Pterop.</td>
<td>5,977</td>
</tr>
<tr>
<td>CP90</td>
<td>07.06</td>
<td>890</td>
<td>34°21.4'</td>
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<td>Shell Pterop. Hexact.</td>
<td>5,977</td>
</tr>
<tr>
<td>CP91</td>
<td>07.06</td>
<td>948</td>
<td>34°22.3'</td>
<td>7°25.1'</td>
<td>Shell Pterop. Hexact.</td>
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</tr>
<tr>
<td>CW92</td>
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<td>1,182</td>
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<td>7°30.3'</td>
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<tr>
<td>CW93</td>
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<td>DW100</td>
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<td>7°42.0'</td>
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<td>278</td>
</tr>
<tr>
<td>DR101</td>
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<td>353</td>
<td>34°10.9'</td>
<td>7°29.8'</td>
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<td>278</td>
</tr>
<tr>
<td>CP103</td>
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<td>34°10.7'</td>
<td>7°29.8'</td>
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</tr>
<tr>
<td>CP106</td>
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<td>1,906</td>
<td>36°05.5'</td>
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<td>Foram. Pterop.</td>
<td>3,384</td>
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<td>DW107</td>
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<td>1,917</td>
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<td>Foram. Pterop.</td>
<td>278</td>
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<td>CP108</td>
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<td>1,527</td>
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<tr>
<td>CP109</td>
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<td>1,206</td>
<td>36°14.5'</td>
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<td>DR111</td>
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<td>35°56.9'</td>
<td>6°22.1'</td>
<td>Foram. Aherma. Pterop.</td>
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<tr>
<td>DR113</td>
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<td>144</td>
<td>35°45.4'</td>
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</tr>
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<td>DW114</td>
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<td>35°45.5'</td>
<td>6°04.2'</td>
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</tr>
<tr>
<td>DR115</td>
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<td>332</td>
<td>35°47.5'</td>
<td>6°04.2'</td>
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<tr>
<td>DW116</td>
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<td>35°48.6'</td>
<td>6°04.2'</td>
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<tr>
<td>DR118</td>
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<td>352</td>
<td>35°48.5'</td>
<td>5°12.5'</td>
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<tr>
<td>CP119</td>
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<td>35°49.7'</td>
<td>5°13.0'</td>
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<tr>
<td>DW120</td>
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<td>425</td>
<td>35°51.2'</td>
<td>5°10.4'</td>
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</tr>
<tr>
<td>DW121</td>
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<td>5°02.1'</td>
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</tr>
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<td>DW122</td>
<td>14.06</td>
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<tr>
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<td>DW126</td>
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<td>998</td>
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<td>3°50.8'</td>
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<tr>
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<td>3°45.1'</td>
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<td>278</td>
</tr>
<tr>
<td>DR130</td>
<td>15.06</td>
<td>145</td>
<td>35°25.3'</td>
<td>4°19.3'</td>
<td>Shell remains</td>
<td>162</td>
</tr>
<tr>
<td>DW132</td>
<td>15.06</td>
<td>170</td>
<td>35°25.7'</td>
<td>4°18.8'</td>
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<td>185</td>
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<tr>
<td>DR133</td>
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<td>35°25.8'</td>
<td>4°17.4'</td>
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<td>312</td>
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<td>DW134</td>
<td>15.06</td>
<td>205</td>
<td>35°25.8'</td>
<td>4°17.0'</td>
<td>Shell remains</td>
<td>278</td>
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<tr>
<td>DR135</td>
<td>15.06</td>
<td>395</td>
<td>35°26.3'</td>
<td>4°14.2'</td>
<td>Shell remains</td>
<td>4,777</td>
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<td>DW136</td>
<td>15.06</td>
<td>298</td>
<td>35°26.5'</td>
<td>4°18.4'</td>
<td>Shell remains + Foram.</td>
<td>278</td>
</tr>
<tr>
<td>CP137</td>
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<td>1,005</td>
<td>35°33.2'</td>
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<td>Shell remains</td>
<td>5,977</td>
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<td>1,275</td>
<td>36°04.9'</td>
<td>3°09.3'</td>
<td>Shell remains</td>
<td>?</td>
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<td>3°03.3'</td>
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<tr>
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<td>16.06</td>
<td>170</td>
<td>35°56.0'</td>
<td>3°06.5'</td>
<td>Shell remains Foram.</td>
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</tr>
<tr>
<td>DW142</td>
<td>16.06</td>
<td>167</td>
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<td>203</td>
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<td>DR143</td>
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<td>252</td>
<td>35°56.9'</td>
<td>3°06.8'</td>
<td>Shell remains Foram.</td>
<td>278</td>
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<tr>
<td>DR144</td>
<td>16.06</td>
<td>314</td>
<td>35°56.0'</td>
<td>3°56.0'</td>
<td>Shell remains Foram.</td>
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<td>CP145</td>
<td>16.06</td>
<td>373</td>
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<td>555</td>
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<td>3°08.6'</td>
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<td>489</td>
<td>35°50.1'</td>
<td>4°57.5'</td>
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<td>35°51.8'</td>
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<th>Lat. N</th>
<th>Long. W</th>
<th>Nat. host.</th>
<th>Area sampled (m²)</th>
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<td>Rock + Coral</td>
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</tr>
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<td>5°34.7'</td>
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<td>Rock + Coral</td>
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<td>CP155</td>
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<td>903</td>
<td>36°19.8'</td>
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<td>Shell Foram. + Pterop.</td>
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<td>DW157</td>
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<td>1,108</td>
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<td>Shell Foram. + Pterop.</td>
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<td>DW158</td>
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<td>1,360</td>
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<td>278</td>
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</table>

1,535 m, le; CP-66, 1,981–2,142 m, 1e; CP-68, 1,998–2,077 m, 1e; CP-106, 1,898–1,909 m, 1e; CP-108, 1,521–1,534 m, 2e. Maximum carapace length, without rostrum, 32 mm.

*Acanthephyra purpurea* A. Milne Edwards, 1881. Examined material: CP-3, 678–684 m, 1e; CP-14, 1,313–1,324 m, 2e; CP-17, 1,434–1,505 m, 1e; DW-13, 1,324–1,433 m, 1e; CP-62, 1,209–1,302 m, 1e; CP-63, 1,488–1,535 m, 1e; CP-66, 1,981–2,142 m, 1e; CP-69, 1,978–2,077 m, 1e; CP-90, 885–895 m, 2e; CP-91, 948 m, 2e; CP-95, 1,378 m, 1e; DW-96, 1,235–1,281 m, 1e; CP-97, 1,498–1,532 m, 2e; CP-106, 1,898–1,909 m, 1e; CP-108, 1,521–1,534 m, 3e. Maximum carapace length, without rostrum, 18 mm; smallest ovigerous females 15 mm.

*Systellaspis debilis* (A. Milne Edwards, 1881). Examined material: CP-03, 678–684 m, 6e; CP-14, 1,313–1,324 m, 1e; CP-18, 1,544–1,612 m, 4e; CP-68, 1,998–2,077 m, 1e; CP-89, 719–724 m, 2e; CP-99, 1,848–1,892 m, 2e; CP-106, 1,898–1,909 m, 1e; CP-156, 1,130–1,140 m, 1e. Maximum carapace length, without rostrum, 13 mm; smallest ovigerous female: 12–13 mm. The eggs are big and the number carried is less than 19.

*Oplophorus spinosus* (Brulle, 1839). Examined material: CP-18, 1,544–1,612 m, le; CP-90, 885–895 m, le. Maximum carapace length, without rostrum, 14.9 mm.

*Family Nematocarcinidae*

*Nematocarcinus gracilipes* Filhol, 1884. Examined material: CP-62, 1,209–1,302 m, 5e; CP-63, 1,488–1,535 m, 2e; CP-90, 885–895 m, 1e; CP-91, 948 m, 1e; CP-95, 1,378 m, 32e; CP-97, 1,498–1,532 m, 1e; CP-106, 1,521–1,534 m, 1e; CP-156, 1,130–1,140 m, 1e. Maximum carapace length, without rostrum, 26 mm; smallest ovigerous female 17 mm.

*Nematocarcinus exilis* (Bate, 1888) (A/ensifer. - Zarriquiez, 1968, in part). Examined material: CP-09, 1,134–1,192 m, 3e; CP-65, 1,805 m, 1e; CP-66, 1,981–2,142 m, 2e; CP-68, 1,998–2,077 m, 1e; CP-89, 719–724 m, 2e; CP-99, 1,848–1,892 m, 2e; CP-106, 1,898–1,909 m, 1e; CP-108, 1,521–1,534 m, 1e; CP-156, 1,130–1,140 m, 1e. Maximum carapace length, without rostrum, 22 mm; smallest ovigerous female: 12–13 mm.

*Family Pasiphaeidae*

*Pasiphaea sivado* (Risso, 1816). Examined material: CP-25, 543–544 m, 3e; CP-86, 507–518 m, 5e; CP-89, 719–724 m, 38e; CP-103, 347 m, 3e; CP-119, 483–551 m, 9e; CP-135, 390–400 m, 1e; CP-149, 354–390 m, 11e; CP-150, 280–300 m, 3e. Maximum carapace length 22 mm; smallest ovigerous female 18 mm.

*Pasiphaea multidentata* Esmark, 1866. Examined material: CP-137, 1,005 m, 1e. Carapace length 49 mm (total 138 mm).

*Eupasiphae serrata* (Rathbun, 1902). Examined material: CP-65, 1,805 m, 1e. Carapace length, without rostrum, 33.9 mm.

*Psathyrocaris infirma* Alcock and Anderson, 1894. Examined material: CP-89, 719–724 m, 4e. Carapace length, without rostrum, 12 to 15 mm.

*Family Alpheidae*

*Alpheus talismani* Coutière, 1898. Examined material: CP-21, 478–491 m, 1e; CP-89, 719–742 m, 1+1? e. Carapace length: 10 to 11.5 mm.

*Alpheus glaber* (Olivi, 1792). Examined material: CP-03, 678–684 m, 1e; CP-25, 543–544 m, 2e; CP-26, 590–394 m, 1e; DW-28, 394–403 m, 1e; DW-32, 250 m, 1e; CP-33, 256 m, 29e; CP-34, 178–182 m, 1e; CP-36, 178–182 m, 16e; DR-45, 293 m, 2e; DR-70, 147 m, 1e; DR-71, 155 m, 8e; DR-72, 173 m, 2e; DR-74, 181 m, 3e; DR-108, 352 m, 1e; CP-135, 390–400 m, 9e; CP-145, 360–386
GARCÍA RASO: DECAPODA FROM BALGIM-84 EXPEDITION

m, 11e; CP-148, 497–503 m, 4e; CP-149, 354–390 m, 5e; CP-150, 290 m, 1e. Maximum carapace length: 13.8 mm; smallest ovigerous female 9 mm.

*Alpheus macrocheles* (Hailstone, 1835). Examined material: CP-109, 1,182–1,216 m, 1e (possibly a contamination); CP-135, 390–400 m, 6e; DR-151, 120–110 m, 1e. Maximum carapace length, 13.5 mm.

*Athanas amazone* Holthuis, 1951. Examined material: CP-34, 178–180 m, 1e; DW-70, 147 m, 1e; DR-71, 155 m, 1e. Maximum carapace length: 4.8 mm; ovigerous female: 3 mm (specimen DR-71).

**Family Processidae**

*Processa canaliculata* Leach, 1815. Examined material: DW-20, 450–454 m, 2e; DR-21, 478–491 m, 3e; CP-25, 543–544 m, 5e; CP-26, 390–394 m, 6e; DW-27, 368–371 m, 7e; CP-33, 256 m, 10e; CP-34, 178–182 m, 1e; CP-103, 347 m, 1e; CP-145, 360–386 m 2e. Maximum carapace length: 18 mm; ovigerous females: 12 to 18 mm.

*Processa nouveli* Al-adhub and Williamson, 1975. Examined material: CP-26, 390–394 m, 2e; DW-27, 368–371 m, 18e; DR-28, 394–403 m, 2 + 3?e; CP-34, 178–182 m, 2e; DR-144, 228–300 m, 9 + â¡©e; CP-149, 354–390 m, 2e. Maximum carapace length: 11.8 mm; smallest ovigerous female: 6,5 mm.

*Processa elegantula* Nouvel and Holthuis, 1957. Examined material: DW-43, 150 m, le; DW-50, 518–526 m, le?. Maximum carapace length: 11.5 mm; ovigerous female: 11.5 mm.

*Processa spp.* Examined material: DR-27, 368–371 m, le (male 3, 8 mm carapace length without rostrum); DR-72, 172 m, le (male of 6.5 mm carapace length, without rostrum).

**Family Pandalidae**

*Heterocarpus grimaldii* A. Milne Edwards and Bouvier, 1900. Examined material: CP-10, 1,582–1,602 m, 3e; CP-17, 1,434–1,505m, 4e; CP-18, 1,544–1,612 m, 3e; CP-62, 1,209–1,302 m, 10e; CP-63, 1,488–1,535 m, 4e; CP-92, 1,182 m, 2e; CP-95, 1378 m, 13e; CP-97, 1,498–1,532 m, 3e; CP-108, 1,521–1,534 m, 14e. Maximum carapace length, without rostrum: 33 mm; ovigerous female: 23.2 to 33 mm.

*Chlorotocus crassicomis* (Costa, 1871). Examined material: CP-21, 478–491 m, 7e; DR-22, 472–462 m, 1e. CP-25, 543–544 m, 5e; CP-26, 390–394 m, 3e; CP-33, 256m, 6e; CP-54, 352–360 m, le; CP-66, 1,981–2,142 m, le; CP-78, 246–250 m, 4e; DR-81, 309 m, 12e; CP-84, 345 m, 28e; CP-103, 347 m, 17e. Maximum carapace length, without rostrum: 22,5 mm; ovigerous female: 17.2 to 22.5 mm.

*Stylopandalus richardi* (Coutière, 1905). Examined material: CP-14, 1,313–1,324 m, 1e; CP-18, 1,544–1,612 m, 1e; CP-66, 1,981–2,142 m, 1e. Maximum carapace length, without rostrum: 8.6 mm; ovigerous female: 6.8 mm.

*Plesionika nai-val* (Fabricius, 1787). Examined material: CP-25, 543–544 m, 1e; CP-78, 246–250 m, 1e. Maximum carapace length, without rostrum: 9 mm (rostrum length: 19 mm).

*Plesionika acanthonotus* (Smith, 1882). Examined material: DW-13, 1,324–1,433 m, 2e; CP-14, 1,313–1,324 m, 1e; CP-62, 1,209–1,302 m, 1e; CP-86, 507–518m, 2e; CP-90, 885–895 m, 2e; CP-91, 948 m, 3e; CP-109, 1,182–1,216 m, 1e; CP-123, 1,230–1,238 m, 5e; CP-124, 1405 m, 1e; CP-155, 903 m, 13e. Maximum carapace length, without rostrum: 16 mm; ovigerous females: 9 to 11 mm.

*Plesionika heterocarpus* (Costa, 1871). Examined material: CP-26, 390–394 m, 2e; CP-33, 256 m, 8e; CP-34, 178–181 m, 10e; CP-54, 352–360 m, 1e; DR-75, 252 m, 3e; CP-78, 246–250 m, 11e; DR-81, 309 m, 12e; CP-84, 345 m, 5e; DR-85, 497 m, 73e; CP-89, 719–724 m, 82e; DR-101, 353 m, 1e; CP-103, 347 m, 11e; DR-113, 144 m, 1e; CP-119, 483–551 m, 1e; DW-134, 205 m, 2e; CP-145, 360–386 m, 1e; CP-155, 903 m, 1e. Maximum carapace length, without rostrum: 16 mm; ovigerous female: 9.3 to 16 mm.

*Plesionika antigai* Zariquiey A., 1955. Examined material: DR-49, 518–524 m, 1e; DW-50, 518–526 m, 5e; DR-115, 332 m, 3e; DW-134, 205 m, 3e. Maximum carapace length, without rostrum: 12.5 mm; ovigerous female 8.5 to 15.5 mm.

*Plesionika gigliolii* (Senna, 1903). Examined material: CP-119, 483–551 m, 2e; CP-135, 390–400 m, 5e; CP-145, 360–386 m, 5e. Maximum carapace length, without rostrum: 15.5 mm; ovigerous female: 15.5 mm.

*Plesionika sp.* Examined material: 1 female, DW-96, 1,235–1,281 m (MNHN Na-11919).

*Plesionika williamsi* Forest, 1964. Examined material: CP-156, 1,130–1,140 m, 1e. Maximum carapace length, without rostrum: 30 mm (rostrum length: 30 mm).

*Plesionika ensis* (A. Milne Edwards, 1881). Examined material: CP-21, 478–491 m, 1e. Carapace length, without rostrum: 8 mm.

*Plesionika martia* (A. Milne Edwards, 1883). Examined material: CP-03, 678–684 m, 9e; CP-62, 1,209–1,502 m, 1e; CP-86, 507–518 m, 32e; CP-89, 719–724 m, 3e; CP-109, 1,182–1,216 m, 6e;
CP-119, 483–551 m, 15e; CP-145, 360–386 m, 1e; DW-146, 544–565 m, 1e; CP-148, 497–503 m, 3e; DR-152, 534–560 m, 1e; CP-155, 903 m, 3e; CP-156, 1,132–1,140 m, 11e; CP-160, 1,340–1,362 m, 2e. Maximum carapace length, without rostrum: 24.5 mm; smallest ovigerous female: 15.5 mm.

*Pandalina profunda* Holthuis, 1946. Examined material: DW-128, 480 m, 1e; DW-136, 298 m, 1e; DR-144, 328 m, 3e; DR, 146, 544–565 m, 7e. Maximum carapace length, without rostrum: 4.5 mm; smallest ovigerous female: 4 mm.

*Pandalina brevirostris* (Rathke, 1843). Examined material: DR-49, 518–524 m, 2e; DW-50, 518–526 m, 1e; DR-151, 120–110 m, 4e; DR-152, 534–535 m, 10e; DR-153, 568–604 m, 49 e. Maximum carapace length, without rostrum: 5.0 mm; ovigerous female: 3.0 to 4.5 mm.

Family *Hippolytidae*

*Eualus lebourae* Holthuis, 1951. Examined material: DR-151, 120–110 m, le. Carapace length, without rostrum: 3.0 mm.

*Merhippolyte ancistrota* Crosnier and Forest, 1973. Examined material: CP-103, 347 m, 2e. Maximum carapace length, without rostrum: 5.8 mm; ovigerous female: 5.2 mm.

Family *Bathypalaemonellidae* (family proposed by Chace, 1992 and previously referred to by Saint-Laurent, 1985)

*Bathypalaemonella serratipalma* L. H. Pequegnat, 1970. Examined material: CP-66, 1,981—2,142 m, le; CP-68, 1,998–2,077 m, 3e. Maximum carapace length, without rostrum: 15 mm; ovigerous female: 13 mm.

Family *Palaemonidae*

*Periclimenes kornii* (Lo Bianco, 1903). Examined material: DR-153, 1 ovigerous female, 568–604 m, (MNHN Na-11916). Diameter of eggs 0.58–0.55 X 0.46–0.40 mm.

Family *Glyphocrangonidae*

*Glyphocrangon longirostris* (Smith, 1882). Examined material: CP-65, 1,805 m, 2e; CP-68, 1,998–2,077 m, 1e; DW-96, 1,235–1,281 m, le; CP-99, 1,848–1,892 m, 5e; CP-106, 1,898–1,909 m, 1e. Maximum carapace length, without rostrum, 24 mm; ovigerous females: 18 mm to 24 mm. The females carried no more than 58 big eggs; diameter: 2.9–2.6 X 2.25–2.15 mm.

Family *Philocheridae*

*Philocheras echinulatus* (Sars, 1862). Examined material: CP-21, 478 m, 6e; DR-25, 543–544 m, 1e; CP-26, 390–394 m, 8e; DW-27, 371–368 m, 1e; CP-33, 256 m, le; CP-34, 178–182 m, 1e; DW-43, 150 m, 1e; DR-45, 293 m, 12e; DW-47, 281 m, 6e; DR-49, 518–524 m, 8e; DW-50, 518–526 m, 18e; DR-51, 362 m, 2e; DW-53, 360 m, 3e; DR-57, 548 m, 1e; DR-85, 495 m, 1e; CP-103, 347 m, 9e; CP-109, 483–551 m, 2e; DR-144, 328 m, 1e; CP-145, 360–386 m, 10e; CP-149, 354–390 m, 1e. Maximum carapace length 9.5 mm; ovigerous female: 7.3 to 9.5 mm.

*Philocheras sculptus* (Bell, 1847). Examined material: DR-42, 133–137 m, 2e; DW-43, 150 m, 5e; DR-71, 155 m, 1e; DR-72, 173 m, 1e; DR-73, 181 m, 1e; DR-74, 181 m, 5e; DR-113, 144 m, 1e; DR-93, 1,203 m, 1e; DR-130, 145 m, 1e. Maximum carapace length, without rostrum: 4.9 mm; ovigerous female: 3.3 to 4.9 mm.

*Philocheras bispinosus* (Hailstone, 1835). Examined material: DW-32, 250 m, 3e. Maximum carapace length 2.5 mm.

*Pontophilus spinosus* (Leach, 1815). Examined material: CP-145, 360–386 m, 1e (11.2 mm carapace length).

*Pontophilus gracilis* Smith, 1882 (non. *P. gracilis* Bate, 1888). Examined material: CP-91, 948 m, 1e.

*Pontophilus cf abyssi* Smith, 1884 (?P. *challengeri* Ortmann, 1893). Examined material: CP-108, 1,521–1,534, 1e.

*Aegaeon lacazei* (Gourret, 1887). Examined material: DR-45, 293 m, 1e; CP-135, 390–400 m, 2e; DR-144, 328 m, 1e; CP-145, 360–386 m, 11e. Maximum carapace length, without rostrum: 12 mm; smallest ovigerous female: 11 mm.

Family *Stenopodidae*

*Spongicoloides koehleri* (Caullery, 1896). Examined material: CP-62, 1,209–1,302 m, 1e; CP-91, 948 m, 1e; CP-92, 1,182 m, 2e. Maximum carapace length: 9.3 mm (female), 7.5 mm (male).

*Spongicoloides evolutus* (Bouvier, 1905). Examined material: CP-62, 1,488–1,535m, 1e; CP-108, 1,521–1,534m, 2e. Maximum carapace length: 7 mm (female) and 6.7 mm (male).

*Spongicoloides profundus* Hansen, 1908. Examined material: CP-98, 1,721–1,773 m, 1 very small specimen (3.3 mm carapace length).
Odontozona edwardsi (Bouvier, 1908). Examined material: CP-62 1,209–1,302 m, 4e; CP-91, 948 m, 1e.

Family Penaeidae

Parapenaeus longirostris (Lucas, 1846). Examined material: CP-21, 478–491 m, 1e; DR-22, 462–472 m, 1e; CP-25, 343–544 m, 3e; CP-33, 256 m, 3e; CP-34, 178–182 m, 1e; DR-45, 293 m, 2e; CP-78, 246–250 m, 6e; DR-81, 309 m, 1e; DR-82, 355 m, 3e; CP-84, 345m, 16e; CP-103, 347 m, 21e; CP-145, 360–386 m, 1e. Maximum carapace length, without rostrum, male: 28.3 mm, female: 34.0 mm.

Penaeopsis serrata Bate, 1881. Examined material: CP-21, 478–491 m, 1e; CP-103, 347 m, 1e. Maximum carapace length, without rostrum: 26.3 mm.

Funchalia woodwardi Johnson, 1867. Examined material: CP-18, 1,544–1,612 m, 1e; CP-21, 478–491 m, 1e. Maximum carapace length, without rostrum: 11.1 mm.

Family Solenoceridae

Solenocera membranacea (Risso, 1816). Examined material: DW-20, 450–454 m, 2e; CP-21, 478–491 m, 5e; CP-25, 543–544 m, 14e; CP-26, 390–394 m, 2e; DR-27, 368–371 m, 4e; CP-33, 256 m, 3e; CP-34, 178–182 m, 5e; DR-73, 181 m, 1e; DR-75, 252 m, 1e; CP-84, 345 m, 1e; CP-103, 347 m, 24e; CP-119, 483–551 m, 1e; CP-135, 390–400 m, 3e; CP-145, 360–386 m, 7e; CP-149, 354–390 m, 7e. Maximum carapace length, without rostrum, male: 15 mm, female: 18 mm.

Hymenopenaeus debilis Smith, 1882. Examined material: CP-09, 1,134–1,192 m, 11e; CP-17, 1,434–1,505 m, 1e; CP-62, 1,209–1,302 m, 3e; CP-90, 885–895 m, 1e; CP-91, 948 m, 2e; CP-97, 1,498–1,532 m, 3e; CP-98, 719–724 m, 1e; CP-108, 1,521–1,534 m, 1e; CP-156, 1,130–1,140 m, 2e. Maximum carapace length, without rostrum, male: 14 mm, female: 19 mm.

One small female of DW-58 (8 mm of carapace length) showed some differences, which related it to H. aphoticus: a red cornea (in alcohol), not black; thelycum with a smaller central rounded area (eighth sternum); and third legs with smaller inner basal expansions.

Family Benthesicymidae

Benthesicymus bartletti Smith, 1882. Examined material: CP-69, 1,978–2,077 m, 1 male of 24.5 mm carapace length (without rostrum).

Bentheogenneina intermedia (Bate, 1888). Examined material: CP-99, 1,848–1,892 m, 1 female of 10.2 mm carapace length (without rostrum).

Benthonectes filipes Smith, 1885. Examined material: CP-97, 1,498–1,532 m, 1 male of 12 mm carapace length (without rostrum).

Gennadas valens (Smith, 1884). Examined material: CP-14, 1,313–1,324 m, 1e; CP-91, 948 m, 1e; DW-96, 1,235–1,291 m, 1e. Maximum carapace length, without rostrum, male: 8.5 mm, female: 9.3 mm.

Family Aristeidae

Aristeus antennatus (Risso, 1816). Examined material: CP-89, 719–724 m, 1e; CP-109, 1,182–1,216 m, 1e; CP-156, 1,130–1,140 9e. Maximum carapace length, without rostrum, male: 28.9 mm, female: 53.1 mm.

Plesiopenaeus edwardsianus (Johnson, 1867). Examined material: CP-10, 1,582–1,602 m, 2e; CP-17, 1,434–1,505 m, 1e; CP-89, 719–724 m, 2e; CP-90, 885–895 m, 4e; CP-92, 1182 m, 12e; CP-95, 1,378 m, 1e; CP-108, 1,521–1,534 m, 2e; CP-160, 1,340–1,362 m, 2e. Maximum carapace length, without rostrum, male: 64.2 mm, female: 80.1 mm.

Family Nephropidae

Nephrops norvegicus (Linnaeus, 1758). Examined material: CP-03, 678–684 m, 11e; CP-21, 478–491 m, 2e; CP-25, 543–544 m, 18e; CP-26, 390–394 m, 2e; CP-33, 256 m, 1e. Maximum carapace length, without rostrum: 45.6 mm.

Nephropsis atlantica Norman, 1882. Examined material: CP-10, 1,582–1,602 m, 4e; CP-62, 1,209–1,302 m, 13e; CP-63, 1,488–1,535 m, 5e; CP-90, 885–895 m, 11e; CP-91, 948 m, 15e; CP-92, 1,182 m, 6e; CP-95, 1,378 m, 6e; CP-108, 1,521–1,534 m, 3e. Maximum carapace length, without rostrum: 27 mm; ovigerous female: 18.8 to 24.8 mm.

Family Palinuridae

Palinurus mauritanicus Grivel, 1911. Examined material: CP-135, 390–400 m, 1 small specimen (8.5 mm carapace length).
Family Polychemelidae

*Polycheles typhlops* Heller, 1862. Examined material: CP-03, 678-684 m, 19e; CP-63, 1,488-1,535 m, 1e; CP-89, 719-724 m, 21e; CP-90, 1,488-1,535 m, 1e; CP-91, 1,182-1,216 m, 1e; CP-109, 1,182-1,216 m, 1e; CP-124, 1,405 m, 2e; CP-160, 1,340-1,362 m, 1e. Maximum carapace length, without rostrum: 40.2 mm. Smallest ovigerous female: 37.4 mm; some of these (from CP-03 and CP-90) carried spermatophors.

*Polycheles crucifera* (Willemoes-Suhm, 1873). Examined material: CP-10, 1,582-1,602 m, le; CP-63, 1,488-1,535 m, le; CP-68, 1,998-2,077 m, le; CP-69, 1,978-2,077 m, 2e; CP-98, 1,721-1,773 m, 2e; CP-99, 1,848-1,892 m, 3e. Maximum carapace length, without rostrum, female: 23.7 mm, male: 16.5 mm. A specimen, from CP-99, is an Eryonidae larva.

*Polycheles granulans* Faxon, 1893. Examined material: CP-69, 1,978-2,077 m, le; CP-95, 1,378 m, le; CP-98, 1,721-1,773 m, 2e; CP-99, 1,848-1,892 m, le. Maximum carapace length, without rostrum, male: 25.4, female: 26.5 mm.

*Stereomastis sculpta* (Smith, 1880). Examined material: CP-68, 1,998-2,077 m, 2e; CP-69, 1,978-2,077 m, 2e; CP-91, 948 m, le; CP-92, 1,182 m, le; CP-98, 1,721-1,773 m, 2e; CP-108, 1,521-1,534 m, le; CP-99, 1,848-1,892 m, le. Maximum carapace length, without rostrum, male: 17.9 mm, female: 32.4 mm.

*Eryoneicus puritanii* Lo Bianco, 1903. Examined material: CP-92, 1,182 m, le.

Family Axiidae

*Calocaris macandreae* Bell, 1846. Examined material: CP-09, 1,134-1,192 m, 2e; DW-27, 371-368 m, le; CP-33, 356 m, le; CP-89, 719-724 m, 3e; CP-127, 720 m, le; DW-128, 480 m, le; CP-135, 390-400 m, 3e; CP-137, 1,005 m, le; CP-148, 497-503 m, 4e. Maximum carapace length: 12.8 mm.

*Calocarides coronatus* (Trybom, 1904). Examined material: CP-127, 720 m, 1 female. Carapace length, without rostrum: 5.1 mm. The specimen have lost the legs and the right third maxilliped.

Family Upogebiidae

*Gebiacantha talismani* (Bouvier, 1915). Examined material: DR-71, 155 m, 1 juvenile.

Family Chirostylidae

*Chirostylus formosus* (Filhol, 1885). Examined material: CP-95, 1,378 m, 3e. The greater specimen is a ovigerous female of 20.5 mm carapace length without the rostrum.

*Uroptychus bouvieri* Caullery, 1896. Examined material: CP-91, 948 m, 1 ovigerous female. Carapace length, without the rostrum: 5 mm.

*Uroptychus maroccanus* Tiirkay, 1976. Examined material: CP-95, 1,378 m, 1 male. Carapace length, without rostrum: 4 mm.

Family Galatheidae

*Munidopsis curvirostra* Whiteaves, 1874. Examined material: CP-68, 1,998-2,077 m, 1e; CP-69, 1,978-2,077 m, 2e; CP-99, 1,848-1,892 m, 4e. Maximum carapace length, without rostrum: 9.3 mm.

*Galathea intermedia* Lilljeborg, 1851. Examined material: DR-113, 144m, 6e; DW-114, 140–158 m, 3e; DR-130, 145 m, le.


*Munida intermedia* A. Milne Edwards and Bouvier, 1899. Examined material: CP-21, 478-491 m, 1e; CP-25, 544-543 m, 7e; CP-33, 256 m, 2e; CP-86, 507-518 m, 1e; CP-135, 390-400 m, 4e. Sex-ratio (females/males): 1.3.

*Munida tenuiman* G. O. Sars, 1872. Examined material: DW-24, 543-546, 1e; CP-14, 1,314–1,324 m, 1e.

*Munida rustall* Zariquiey, 1952. Examined material: CP-26, 390–394 m, 6e; CP-33, 256 m, 15e; CP-34, 178–182 m, 28e; CP-45, 352-360 m, 10e; CP-62, 1,209–1,303 m, 1e; CP-103, 347 m, 2e; DW-132, 170 m, 4e; DR-133, 195 m, 4e; CP-134, 205 m, 1e; CP-145, 360–386 m, 1e. Maximum carapace length, without rostrum: 19.1 mm; smallest ovigerous female: 5.8 mm.

Family Diogenidae

*Dardanus arrosor* (Herbst, 1796). Examined material: DR-49, 518–524 m, 1e; CP-86, 507–518 m, 2e; DW-114, 140–158 m, 2e; CP-119, 483–551 m, 1e; CP-123, 195 m, 1e; DW-134, 205 m, 1e; DR-141, 165–177 m, 1e; CP-145, 360–386 m, 1e; CP-149, 354–390 m, 7e. Smallest ovigerous female: 10 mm cephalothoracic shield length.

Family Paguridae

*Pagurus prideaux* Leach, 1815. Examined material: CP-119, 483–551 m, 1e; DW-132, 170 m, 3e; DW-136, 298 m, 4e; DW-142, 167 m, 1e; CP-145, 360–386 m, 16e; CP-149, 354–390 m, 2e.

*Pagurus alatus* Fabricius, 1775. (Non *Pagurus alatus* - Zariquiey 1968) Examined material: CP-03,
GARCÍA RASO: DECAPODA FROM BALGIM-84 EXPEDITION

678–684 m, 25e; CP-09, 1,134–1,192 m, 31e; CP-14, 1,313–1,324 m, 28e; CP-17, 1,435–1,505 m, 23e; DW-20, 454–450 m, 2e; CP-21, 478–491 m, 109e; CP-25, 543–544 m, 27e; DW-28, 394–403 m, 1e; DR-37, 860–868 m, 2e; DR-49, 518–524 m, 1e; CP-54, 352–360 m, 5e; DR-85, 497 m, 3e; CP-86, 507–518 m, 154e; CP-89, 719–724 m, 62e; CP-90, 885–895 m, 17e; CP-91, 948 m, 15e; CP-92, 1,182 m, 6e; CP-109, 1,182–1,216 m, 99e; CP-145, 386–360 m, 1e; CP-155, 903 m, 13e; CP-156, 1,140–1,130 m, 152e; CP-160, 1,362–1,340 m, 5e. Smallest ovigerous female: 2.5 mm cephalothoracic shield length.

Catapaguroides microps A. Milne Edwards and Bouvier, 1892. Examined material: CP-63, 1,488–1,535 m, 1e; CP-68, 1,998–2,077 m, 4e; CP-69, 1,878–2,077 m, 3e; CP-92, 1,182 m, 12e; CP-95, 1,378 m, 5e; DW-96, 1,281–1,235 m, 1e; CP-99, 1,848–1,892 m, 1e; CP-108, 1,521–1,534 m, 2e. Smallest ovigerous female: 2.0 mm cephalothoracic shield length.

Catapaguroides iris Bouvier, 1922. Material examinado: CP-63, 1,488–1,535 m, 1e; CP-68, 1,998–2,077 m, 4e; CP-69, 1,878–2,077 m, 3e; CP-92, 1,182 m, 12e; CP-95, 1,378 m, 5e; DW-96, 1,281–1,235 m, 1e; CP-99, 1,848–1,892 m, 1e; CP-108, 1,521–1,534 m, 2e. Smallest ovigerous female: 2.0 mm cephalothoracic shield length.

Anapagurus laevis (Bell, 1846). Material examinado: DR-40, 360 m, 3e; DR-49, 518–524 m, 5e; DW-50, 526–518 m, 2e; DR-115, 332 m, 7e; CP-119, 483–551 m, 3e; DW-132, 170 m, 3e; DR-134, 205 m, 2e. Smallest ovigerous female: 3.2 mm cephalothoracic shield length.

Anapagurus longispina A. Milne Edwards and Bouvier, 1900. Examined material: DW-74, 181 m, 3e; DR-133, 195 m, 2e. Ovigerous female of 1.7 mm cephalothoracic shield length.

Nematopagurus longicomis A. Milne Edwards and Bouvier, 1892. Examined material: DW-132, 170 m, 3e; DR-133, 195 m, 2e. Ovigerous female of 1.3 mm cephalothoracic shield length.

Family Parapaguridae

Parapagurus pilosimanus S. I. Smith, 1879. Examined material: CP-10, 1,582–1,602 m, 3e; CP-17, 1,434–1,505 m, 1e; CP-18, 1,344–1,612 m, 1e; CP-63, 1,488–1,535 m, 2e; CP-65, 1,805 m, 3e; CP-68, 1,998–2,077 m, 6e; CP-69, 1,978–2,077 m, 3e; CP-92, 1,182 m, 2e; CP-95, 1,378 m, 5e; DW-96, 1,281–1,235 m, 1e; CP-99, 1,848–1,892 m, 1e; CP-108, 1,521–1,534 m, 2e. The specimens belonging (in accordance with its chelipeds) to the subspecies or species P. p. pilosimanus and P. p. nudus (Saint-Laurent, 1972; Lemaitre, 1986).

Sympagurus bicristatus (A. Milne Edwards, 1880). Examined material: CP-10, 1,582–1,602 m, 16e; CP-17, 1,434–1,505 m, 57e; CP-92, 1,182 m, 12e; CP-156, 1,140–1,130 m, 5e; DW-157, 1,108 m, 3e. Ovigerous female of 3.5 mm cephalothoracic shield length.

Sympagurus acinops Lemaitre, 1989. Examined material: CP-97, 1 ovigerous female, 1,498–1,532 m (MNHN-Pg 4454). Eggs, diameter: 0.8–0.71 X 0.71–0.61 mm.

Strobopagurus gracilipes (A. Milne Edwards, 1891). Examined material: CP-156, 1,140–1,130 m, 1 male. Cephalothoracic shield length: 4 mm.

Family Homolidae

Homologenus rostratus A. Milne Edwards, 1880. Examined material: CP-10, 1,582–1,602 m, le; CP-63, 1,488–1,535 m, 3e; CP-69, 1,998–2,077 m, 2e; DW-88, 738–742 m, 3e; CP-92, 1,182 m, le; CP-95, 1,378 m, le; CP-99, 1,848–1,892 m, 10e. Maximum carapace width.—female: 12.2 mm (smallest ovigerous females: 11.1 mm) male: 8.6 mm.

Homola barbata (Fabricius, 1793). Examined material: CP-84, 345 m, le; CP-34, 178–182 m, le. Both specimens are juveniles.

Family Cymonomidae

Cymonomus grandatus (Thomson, 1873). Examined material: DW-20, 454 m, 7e (more 2 megalops); CP-21, 478–491 m, 1e; DR-22, 462–472 m, 2e; DW-71, 155 m, 1e; CP-109, 1,182–1,216 m, 2e; DW-128, 480 m, 4e; CP-135, 390–400 m, 4e; DW-157, 1,108 m, le. Maximum carapace length, with rostrum.—male: 5.5 mm; female: 5.7 mm (smallest ovigerous female: 3.5 mm).

Family Dorippidae

Ethusa talismani A. Milne Edwards and Bouvier, 1897. Examined material: CP-66, 1,981–2,142 m, 1e; DR-69, 1,978–2,077 m, 1e; CP-99, 1,848–1,892 m, 1e; CP-106, 1,898–1,909 m, 1e. Also, there is a female specimen dated from DR-72, at 173 m, but probably it is a “contamination” error. All captured specimen are females. Maximum carapace width: 9.3 mm.

Family Calappidae

Calappa granulata (Linnaeus, 1758). Examined material: DW-43, 150 m, 1e; DR-113, 144 m, 4e; DW-114, 140–158 m, 1e. Ovigerous female: 66 mm of carapace width.

Family Leucosiidae

Ebalia nux A. Milne Edwards, 1883. Examined material: DW-20, 450–455 m, 1e; CP-21, 478–491 m, 1e; DR-45, 293 m, 1e; DW-53, 364 m, 2e; DW-71, 155 m, 1e; DW-74, 181 m, 5e; DR-72, 173 m, 1e; DR-80, 309 m, 4e; DR-82, 355 m, 15e; CP-84, 345 m, le; DR-85, 497 m, 1e; DW-87,
500 m, 1e; CP-119, 483–551 m, 2e; DW-128, 480 m, 2e; DW-132, 170 m, 2e; DR-133, 195 m, 13e; DW-134, 205 m, 5e; CP-135, 390–400 m, 25e; DW-136, 298 m, 5e; DW-142, 167 m, 1e; DR-144, 300–328 m, 1e; CP-145, 386–360 m, 1e; DW-146, 544–565 m, 1e; CP-149, 354–390 m, 3e.

**Ebalia cranchii** Leach, 1817. Examined material: DW-71, 155 m, 3e; DR-72, 173 m, 1e; DR-74, 181 m, 4e; DR-133, 195 m, 1e. Maximum carapace width.—male: 9.3 mm; female: 9.3 mm; smallest ovigerous female: 5.6 mm.

**Ebalia granulosa** H. Milne Edwards, 1837. Examined material: CP-34, 178–182 m, 4e (2 males and 2 females). Carapace width.—male: 8.3–8.5 mm, ovigerous female: 8.0–8.8 mm).

**Ebalia sp.** (?E. tumefacta or ?E. deshayesi) Examined material: CW-134, 205 m, 1 female in bad condition. Carapace width 6.1 mm.

**Family Portunidae**

**Polybius henslowii** Leach, 1820. Examined material: CP-21, 478–491 m, 6e; CP-25, 543–544 m, 2e; CP-26, 390–394 m, 64e; CP-33, 256 m, 21e; DW-50, 518–526 m, 8e; DW-53, 364 m, 2e; CP-84, 345 m, le; CP-115, 332 m, 6e. Maximum carapace width.—male: 48.9 mm; female: 47.8 mm.

**Bathynectes maravigna** (Prestandrea, 1839). Examined material: CP-25, 543–544 m, 14e; DW-50, 518–526 m, 2e; CP-86, 507–518 m, 2e; CP-90, 895 m, 1e; CP-109, 1,182–1,216 m, 1e; CP-135, 390–400 m, 2e; CP-156, 1,130–1,140 m, 1e. Maximum carapace width (without lateral teeth).—male: 45.9 mm; female: 50.8 mm.

**Macropipus tuberculatus** (Roux, 1830). Examined material: CP-145, 360–386 m, 1e; CP-149, 354–390 m, 1e; (both specimens are females. Carapace width: 18.0 and 40.6 mm respectively.

**Liocarcinus maculatus** (Risso, 1827). Examined material: DR-42, 133–137 m, 3e; DW-43, 150m, 6e; DW-132, 170 m, le. Maximum carapace width.—male (DR-42): 10.8 mm.

**Liocarcinus depurator** (Linnaeus, 1758). Examined material: DW-142, 167 m, 2e; DW-134, 205 m, 1e. The three specimens (1 male, 1 female; 1 male, respectively) are small. Carapace width.—female: 12.0 mm, male: 12.0 mm.

**Family Goneplacidae**

**Goneplax rhomboides** (Linnaeus, 1758). Examined material: CP-03, 678–684 m, 1e; CP-25, 543–544 m, 11e; CP-26, 390–394 m, 35e; DW-27, 368–371 m, 3e; DW-28, 394–403 m, 2e; CP-33, 256 m, 1e; CP-34, 178–182 m, 9e; DR-51, 362 m, 6e; CP-54, 352–360 m, 47e; CP-62, 1,209–1,302 m, 2e; TR-70, 147 m, 3e; DR-71, 155 m, 7e; DR-72, 173 m, 3e; DR-73, 181 m, 1e; DR-101, 353 m, 5e; CP-103, 347 m, 5e; DR-118, 352 m, 2e; DR-144, 300–328 m, 1e; CP-149, 354–390 m, 3e. Maximum carapace width.—male: 34.3 mm; female: 22.6 mm; smallest ovigerous female: 13.4 mm.

**Family Xanthidae**

**Pilumnus inermis** A. Milne Edwards and Bouvier, 1894. Examined material: DW-132, 170 m, 11e; DR-133, 195 m, 4e. Maximum carapace width.—male: 11.4 mm; female: 14.4 mm; smallest ovigerous female: 6.6 mm.

**Xantho pilipes** A. Milne Edwards, 1867. Examined material: DR-42, 133–137 m, 1 juvenile.

**Monodaeus guinotae** Forest, 1976. Examined material: CP-21, 478–491, 2e; DR-22, 462–472 m, 3e; DR-23, 556 m, 4e (1 female with Sacculina), CP-25, 543–544 m, 7e; DR-37, 860–868 m, 1e; DR-51, 362 m, 6e; CP-54, 352–360 m, 47e; CP-62, 1,209–1,302 m, 2e; TR-70, 147 m, 3e; DR-71, 155 m, 7e; DR-72, 173 m, 3e; DR-73, 181 m, 1e; DR-101, 353 m, 5e; CP-103, 347 m, 5e; DR-118, 352 m, 2e; DR-144, 300–328 m, 1e; CP-149, 354–390 m, 3e. Maximum carapace width.—male: 34.3 mm; female: 22.6 mm; smallest ovigerous female: 13.4 mm.

**Family Parthenopidae**

**Parthenope macrochelos** (Herbst, 1790). Examined material: DW-136, 298 m, 1 male. Carapace width: 42.1 mm.

**Parthenope expansa** (Miers, 1879). Examined material: DW-132, 170 m, 6e. Maximum carapace width.—male: 10 mm, female: 7.5 mm, smallest ovigerous female: 6.8 mm.

**Parthenope massena** (Roux, 1830). Examined material: DR-42, 133–137 m, 4e. Maximum carapace width.—male: 7.2 mm; female: 10.8 mm, ovigerous female: 10.8 mm.

**Heterocrypta maltzami** Miers, 1881. Examined material: DW-132, 170 m, 1 female. Carapace width: 5.5 mm.

**Family Parthenopidae**

**Erasticus clouei** Studer, 1883. Examined material: CP-20, 450–455 m, 1e; CP-21, 478–491 m, 2e; CP-25, 543–544 m, 2e; CP-26, 390–394 m, 1e; CP-91, 948 m, 2e; CP-135, 390–400 m, 10e. Maximum carapace width.—male: 16.9 mm (14.5 mm without teeth); female: 11.0 mm (10.4 mm without teeth), smallest ovigerous female: 7.6 mm.
Figure 1. *Plesionika* sp. A—carapace in lateral view; B—second pereopods, and C—abdomen in lateral view. Scales in mm.

**Dorhynchus thomsoni** Thomson, 1873. Examined material: CP-62, 1,209–1,302 m, 1e; C-91, 948 m, 2e. Maximum carapace width.—male: 6.5 mm; female: 6.3 mm.

**Rochinia carpenteri** (Thomson, 1873). Examined material: CP-90, 885–895 m, 3e; CP-91, 948 m, 3e; CP-92, 1,182 m, 9e; CP-95, 1,378 m, 2e; CP-135, 390–400 m, 1e; CP-160, 1,340–1,362 m, 1e. Maximum carapace width (without lateral teeth).—male: 14.3 mm, female: 24.6 mm, ovigerous female: 24.6 mm.

**Eurynome aspera** (Pennant, 1777). Examined material: DR-42, 133–137 m, 6e; DW-43, 150 m, 2e; DW-74, 181 m, 1e; DR-130, 145 m, 1e; DW-132, 170 m, 7 + 2?e; DR-133, 195 m, 1e. Maximum carapace width.—male: 9.0 mm, female: 9.7 mm.

**Eurynome spinosa** Hailstone, 1835. Examined material: DR-42, 133–135 m, 1 female: 4.8 mm of carapace width.

**Macropodia tenuirostris** (Leach, 1814). Examined material: CP-33, 256 m, 1e; CP-82, 355 m, 1e; CP-84, 345 m, 1e; DW-114, 140–158 m, 1e; CP-119, 483–551 m, 1e; DW-134, 205 m, 1e; CP-145, 390–386 m, 4e; CP-149, 354–390 m, 1e. Maximum carapace width.—male: 13.9 mm, female: 13.0 mm, smallest ovigerous female: 13 mm.

**Macropodia linaresi** Forest and Zariquiey A., 1964. Examined material: DW-114, 140–158 m, 3e. Maximum carapace width.—male: 3.8 mm, female: 5 mm, ovigerous female: 5 mm.

**Inachus leptochirus** Leach, 1817. Examined material: DR-40, 362 m, 1e; DW-50, 518–526 m, 2e; DW-57, 548 m, 1e; CP-119, 483–551 m, 1e. Maximum carapace width.—male: 21 mm, female: 17.4 mm.

**Inachus dorsettensis** (Pennant, 1777). Examined material: CP-34, 178–182 m, 1e; DR-42, 133–135 m, 3e; DW-43, 150 m, 11e; DW-114, 140–158 m, 2e; CP-150, 280–300 m, 1e. Maximum carapace width.—male: 11.3 mm, female: 8.2 mm, smallest ovigerous female: 6.2 mm. Ratio carapace length/width.—male: 1.08 to 1.27, female: 1.1 to 1.25.

**CONSIDERATION OF SOME SPECIES**

**Plesionika sp.**

**Discussion.**—Probably, the single captured specimen (1 female, St. DW-96) belongs to a new species (Fig. 1); but, because this one is not well preserved and a relative variability exists in this *Plesionika* group, no specificic name can be given.
Description.—Rostrum more or less straight, slightly overreaching distal end of antennal scale, with 10 dorsal teeth, all fixed and distributed regularly over entire length, including 5 on carapace posterior to level of orbital margin; ventral margin armed with 4 teeth (Fig. 1A). Carapace with slight middorsal carina becoming obsolete in posterior ½ and lacking lateral carinae. Antennal spine overreaching branchiostegal spine. Antennular peduncle with ventromesial tooth on basal article. Stylocerite slightly reaching basal level of second article of antennal peduncle. Distolateral tooth of antennal scale not reaching distal margin of blade. Third maxillipede with exopod, distal part of penultimate segment overreaching distal margin of antennal scale. Specimen only has first left pereopod and two second ones. With epipods on 4 anterior pairs of pereopods. Second legs short and slightly unequal; left thicker and shorter than right one and with carpus of 5 articles (1 > 5 > 2 = 3 = 4), which do not reach distal part of antennal blade; right, with carpus of 17 articles overreaching distal level of antennal scale.

Abdominal segments (Fig. 1C) without middorsal carina or boss on tergum. Postero-dorsal margin of third somite rounded and without median tooth. Pleura of fourth segment rounded, fifth with sharp posteroventral tooth. Sixth somite about twice (1, 87) as long as 5th. Specimen lacking telson.

Coloration.—after 6 years preserved in alcohol, only a yellowish-orange color could be detected, more intense on gastric carapace area and on the tergum of abdominal somites.

Remarks.—The specimen belongs to the Plesionika group with short rostrum, without dorsal posterior movable teeth, and with the second pereopods slightly unequal in length, in which are included P. bifurcata Alcock and Anderson, 1894, P. spinidorsalis (Rathbun, 1906) (Burukovsky, 1981; Chace, 1985), P. laevis (A. Milne Edwards, 1883), (redescribed by Kensley and Tobias, 1985 and previously placed in the genus Heterocarpus from which it was transferred to Plesionika by Crosnier, 1986a) and P. fenneri Crosnier, 1986 (Crosnier, 1986a, b). Heterocarpus alexandri A. Milne Edwards, 1883 is also closely related (Chace, 1989).

However, our specimen differs from these species as follows: P. fenneri has 1 or 2 dorsal movable spines on the carapace. P. laevis and P. bifurcata (also P. fenneri) have a curved rostrum directed oblique-dorsally, and a different rostral formula (postero-orbital dorsal teeth + rostral teeth/ventral teeth): 6-7 + 6/12-13, and 3 + 4/6 respectively. P. laevis and H. alexandri show a middorsal carina or a boss on tergum of 3rd abdominal somite. In P. laevis, P. fenneri and P. bifurcata the pleura of fourth abdominal segment have a sharp posteroventral tooth. P. spinidorsalis, from Hawaii and South China Sea, is a closely related species with similar rostrum, but with 7 to 10 postorbital dorsal teeth and pleura of fifth abdominal segment rounded posteroventrally.

Philocheras echinulatus (M. Sars, 1862)

Crangon echinulatus M. Sars, 1862: 186.
Cheraphilus echinulatus : G. O. Sars, 1882
Philocheras echinulatus : Kemp, 1910: 144, pl. 21, fig 7a-d.

Discussion.—Chace (1984) analyzed the validity of the genus Philocheras, which had been treated as a synonym of Pontophilus by several authors following Kemp (1911), and recognized it as a distinct taxon. Chace distinguished the species of Philocheras from Pontophilus by: 1) the absence of lateral teeth
on the basal half of the rostrum, 2) the absence of a longitudinal suture extending from the orbital margin to the branchial region of carapace (although there is an apparently suborbital suture in *Pontophilus gorei* Dardeau, 1980), and 3) the absence of any trace of an exopod on the first pereopod. Moreover, some "inconstant" characters may also justify the subdivision into two genera.

The species *Philocheras echinulatus* (as happens in *Pontophilus gorei*) shows some characters of *Pontophilus*. Thus, it has a longitudinal suture extending obliquely from the orbital margin to the branchial region of carapace and the development of the endopods of pleopods, which are different in males and females, show an intermediate position (Zariquiey, 1968; Smaldon, 1979). In males, the endopods are longer than \( \frac{1}{2} \) exopods length (but not in females) and, on the 2nd to 5th, an appendix interna is present (but not in females).

*Spongicoloides koehleri* (Caullery, 1896)

Figure 2

*Spongicoloides koehleri* Caullery, 1896: 382, pl.16, figs. 1–9.

Discussion.—There are some anatomical characters that, because of its taxonomical importance in the group, must be discussed.

In the studied specimens the epipods of 4th pereopod could be lacking (are lacking in specimens CP-92, are rudimentary in CP-91 and are well developed
in CP-62), therefore this is a variable character (referred before by Saint-Laurent and Cleva, 1976).

On the other hand, in the Balgim-84 specimens and in all preserved specimens in the collection of the "Muséum National d'Histoire Naturelle" of Paris, the third maxillipeds have no exopods but there are well developed ones on the 2nd maxillipeds (Fig. 2B). This last is against the characteristics of the genus referred by Hansen (1908) for Spongicolooides profundus and Holthuis (1946)'s data. Also, the exopod on the 2nd maxilliped was used by Bruce and Baba (1973) to describe the genus Spongiocaris. Subsequently, Saint-Laurent and Cleva (1976) considered this last genus as a synonym of Spongicolooides and they modified the generic diagnosis, including in it the existence or not of an exopod on the maxilliped (which was not taken in account by Baba, 1983).

Other differences found in the Balgim-84 specimens are the lack of pleurobranch on the 2nd maxilliped and the existence of an arthrobranch on the first one.

This species has been cited in Iberic waters, from the Gulf of Vizcaya, at 1,410 m (Caullery, 1896) and close to the Straits of Gibraltar (Sund, 1920; Holthuis, 1946). During Balgim-84, it was caught in the central area of the Gulf of Cadiz and off Rabat.

_Spongicolooides evolutus_ (Bouvier, 1905)

Figure 3

_Spongicola evoluta_ Bouvier, 1905: 983.

Discussion.—A rare species, described by Bouvier (1905) from specimens caught off Sahara at 882 m. Later, it was cited by Bouvier (1908), Milne Edwards and Bouvier (1909) and Holthuis (1946). The last author stated that figures are needed. They are given in (Fig. 3).

As in the species mentioned above, there are interesting anatomical characters with regard to the branchial formula. The branchial formula shown by Bouvier (1905) is similar to that of _Spongicola venusta_ and _Spongicolooides koehleri_ with the only difference that the epipods of the walking pereopods are lacking. Later, Holthuis (1946) in a comparative study gave some differences in relation to _S. koehleri_ (in contrast to Bouvier's data); he cited 1 arthrobranch (not 2) on the 3rd maxilliped, but 2 arthrobranches exist in _S. koehleri_ and in the Balgim specimens of both species (as on the 1st to 4th walking pereopods). On the other hand (as happened in _S. koehleri_) pleurobranches have not been found on the 2nd maxillipeds, but there is one arthrobranch on the 1st maxillipeds.

Baba (1980) described a new species _S. novaezelandiae_ close to _S. evolutus_. The differences are in the gills of the maxillipeds; in Baba's species there are A) 2 arthrobranches on the 3rd maxilliped (which is not a valid character to separate them, as has been shown), B) 2nd maxillipeds without pleurobranches (neither valid) and with 2 arthrobranches, and C) one arthrobranch on the 1st (neither valid). The only useful character to differentiate both species is the number of arthrobranches placed on the 2nd maxilliped (2 in Baba's species and 1 in Bouvier's species).

On the other hand, in relation to the size, differences in the gill development have been observed. The smallest specimens (CP-63, 4 mm of carapace length) show less developed gills and the anterobasal arthrobranches are as simple plates. These differences in the branchial development, the few known specimens, the fragility of these structures, and the differences found in references should lead us to be careful when using the branchial formula to separate species.
Figure 3. *Spongicoloides evolutus* (Bouvier, 1905). Specimen from CP-108. A: carapace, lateral view, B: left antennal scale, dorsal view, C: telson and left uropod, dorsal aspect, D: left 3rd pereopod, and E: left 4th pereopod, propodus and dactyl. Scales in mm.

The Balgim-84 specimens come from the central area of the Gulf of Cadiz and off Huelva. This species could be easily differentiated from the one above by the telson, which is wider distally (Fig. 3c).

*Spongicoloides profundus* Hansen, 1908

*Spongicoloides profundus* Hansen, 1908: 45, pi. 3, fig. 5a–k, pi. 4, fig. la–l.

Discussion.—This species is only known from the reference of Hansen (1908), 4 specimens were caught from bottoms with sponges SW of Iceland, at 1,480 m. Our very small specimen came from off Rabat.

This species is close to *S. novaezelandiae* and *S. evolutus* (all with wide distal end of telson) and it could be differentiated from the other Atlantic species, *S. evolutus*, because there is only one small arthrobranch on the 1st to 4th pereopods (not 2).

*Odontozona edwardsi* (Bouvier, 1908)

Figure 4

Richardina edwardsi Bouvier, 1908: 888.


Discussion.—A rare species, cited by Bouvier (1908) from the northwest African coast, off Morocco and Sudan.

Some Balgim specimens have been figured (Fig. 4), because Holthuis (1946) believed it was necessary.
Figure 5. *Monodaeus guinotae* Forest, 1976. Specimen from CP-25. Right half of carapace and merus of last pereopods. Scale in mm.

*Monodaeus guinotae* Forest, 1976

Figure 5

*Micropanope* sp. Forest and Guinot, 1958: 12, figs. 8,9.

Discussion.—The morphology of the captured specimens are in accordance with Forest’s figures and description and with the data given by Türkay and Koukouras (1988). The anterolateral teeth of the carapace are acute and directed outward, and the walking legs are slender and long, so the distal part of the merus of 4th pereopod overreaches the apex of the ultimate or even penultimate anterolateral teeth.

This Mediterranean species (Manning and Holthuis, 1981) is very close to *M.*
couchi, even in the first male pleopod, which in Xanthidae has high taxonomic value, and is similar in both species (Türkay and Koukouras, 1988). It is possible that some Mediterranean references given as M. couchi could belong to M. guinotae. On the other hand, one examined specimen from Portugal showed a doubtful position, suggesting it would be interesting to review the specimens from the Portuguese waters.

**Munida sarsi** Huss, 1935 and **Munida intermedia** Lilljeborg, 1851

Some anatomical differences of taxonomic interest have been found. According to Rice and Saint-Laurent (1986) *M. sarsi* lacks a spine at the distal external angle of merus of the third maxilliped, which is present in *M. intermedia*. However, in some Balgim specimens belonging to *M. sarsi* a spine or sharp projection has been found.

The two species could be readily distinguished by the striae on the abdominal tergites, in having many more intercalary striae *M. sarsi* (Rice and Saint-Laurent, 1986: fig. 4a, b; p. 157). However, it is important to know that with size, and in both species, an increase in the number of the striae occurs; thus, Rice and Saint-Laurent's figures belong to medium size specimens, but in the largest ones more intercalary striae appear and, in this way, the pattern found in big *M. intermedia* specimens is similar to the one found in medium sized specimens of *M. sarsi*.

On the other hand, the spines of the fourth abdominal tergite are lacking in most small specimens of *Munida intermedia* (size less than 16.6 mm of carapace length, without rostrum, ex. CP-135), which is more common in specimens from northern European areas (Rice and Saint-Laurent, 1986). Also, they are more often present in large specimens (ex. CP-25) than in smaller. In consequence, this character exhibits a considerable geographical and ontogenetic variation.

**New Records of Species from the Studied Area.**—The capture of some species from the study area represent their first record for the Mediterranean Sea, east Atlantic waters and/or Iberian waters.

The capture of one specimen of *Calocarides coronatus* Trybom, 1904 from Alboran Sea, off Alhucemas Bay-Cabo Quilates (Morocco), represents the first record of the species for the Mediterranean Sea and extends its distribution area. Previously it was only known from north European waters (Trybom, 1904; Wolvebaek, 1908; Balss, 1926 in Bouvier, 1940).

*Catapagroides iris* Bouvier, 1922 was only known from Azores (Bouvier, 1922; Saint-Laurent, 1968). This is also the case with *Strobopagurus gracilipes* (A. Milne Edwards, 1891) (Milne Edwards and Bouvier, 1894).

The capture of one specimen of *Sympagurus acinops* Lemaitre, 1989, off Rabat, represents the first record of the species from east Atlantic waters (Lemaitre, 1989) and shows an amphi-Atlantic distribution.

The capture of *Alpheus talismani* Coutière, 1898 and *Merhippolyte ancirotata* Crosnier and Forest, 1973, in the Gulf of Cadiz, represents the northern known limit of the species distribution (Holthuis, 1951; Crosnier and Forest, 1966; 1973).

The presence of *Monodaeus guinotae* Forest, 1976, in the entire study area represents a new record of the species for Spanish waters and the Atlantic Ocean (Forest, 1965, 1976; Forest and Guinot, 1958; Türkay and Koukouras, 1988).

Finally, other new records for Spanish waters are the capture of: *Spongicoloides evolutus, Alpheus talismani, Athanas amazone* Holthuis, 1951 (García Raso, 1987); *Plesionika williamsi* Forest, 1964; *Eualus cf lebourae* Holthuis, 1951 (Holthuis, 1951); *Periclimenes kornii* (Lo Bianco, 1903) (Saint-Laurent and García
Raso, 1993) and Pontophilus cf. abyssi Smith, 1884 (Crosnier and Forest, 1973; Chace, 1984; Saint-Laurent, 1985).

However, the capture of Eupasiphae serrata (Rathbun, 1902) confirms its presence in Iberian waters, because (although it was not cited by Zariquiey, 1968) Crosnier (1988) mentioned that some references of Parapasiphea grimaldii given for Spanish waters could belong to this species.

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LITERATURE CITED


GARCÍA RASO: DECAPODA FROM BALGIM-84 EXPEDITION

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