

Contribution to the knowledge of decapod crustaceans from Madeira and the Canary Islands

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Key words: Crustacea; Decapoda; Madeira; Canary Islands; Azores; Cape Verde Islands; new records. The decapods *Eualus lebourae*, *Processa modica carolii*, *Palaemon xiphias*, *Philocheras bispinosus*, and *Inachus phalangiium* are recorded from the coasts of Madeira for the first time. The decapods *Hippolyte garciarasoii*, *Hippolyte varians*, *Eualus lebourae*, *Processa parva*, *Processa modica carolii*, *Processa robusta*, *Palaemonella atlantica*, *Periclimenes wirtzi*, *Philocheras bispinosus*, and *Philocheras fasciatus*, are recorded from the coasts of the Canary Islands for the first time. *Eualus occultus*, *Processa parva* and *Processa modica carolii* are recorded from the Cape Verde Islands for the first time. *Processa parva* is also recorded for the Azores for the first time.

For *Eualus occultus*, *Hippolyte garciarasoii*, *Processa modica carolii*, *Periclimenes wirtzi* and *Philocheras fasciatus* this is an extension of the known range to the south. For *Eualus lebourae*, *Processa parva* and *Palaemonella atlantica* this is an extension of the known range to the north.

The presence of *Palaemon serratus*, *Eualus occultus*, *Philocheras trispinosus*, *Hippolyte leptocerus*, and *Pilumnus villosissimus* at Madeira is confirmed.

Introduction

During the Dutch CANCAP expeditions (Van der Land, 1987) and during an ongoing survey of the larger marine invertebrates at the coasts of Madeira by the second author (Wirtz, 1995, 1996a, 1996b), several decapod species were caught that apparently had not yet been recorded from there. In the following, we describe four such cases and confirm the presence of five hitherto doubtful or little-known decapod species from Madeira. We also give eight new records for the decapod fauna of the Canary Islands. Additional, so far unpublished observations of these species made during the CANCAP expeditions (Van der Land, 1987) are added throughout.

Material and Methods

The survey of the larger marine invertebrates of the coasts of Madeira is performed SCUBA-diving and therefore limited to a depth range down to about 60 m. Animals are photographed in the field. When it appeared necessary, specimens were collected for later identification.

Specimens were deposited in the collections of the Nationaal Natuurhistorisch Museum at Leiden (was Rijksmuseum van Natuurlijke Historie, RMNH) and the Museu Municipal de Funchal (MMF).

Results

Family Hippolytidae

Eualus lebourae Holthuis, 1951

Eualus lebourae Holthuis, 1951: 124-127, fig. 26; Rossignol, 1962: 130; Crosnier & Forest, 1975: 161-162, fig. 49.

Material.— **Azores.**— 4 specimens (RMNH D 46236); Sta. CANCAP 5.142; W of Pico, 38°35'N 28°33'W; depth 108-118 m; *Chama* bed; rectangular dredge; 7.vi.1981.— 1 ♂ (RMNH D 46238): Sta. CANCAP 5.056; S of Sao Miguel, 37°41'N 25°26'W; depth 180 m; fine sand; van Veen grab; 31.v.1981.— 3 specimens (RMNH D 46240): CANCAP sta. 5.086; E of Faial, 38°31'N 28°36'W; depth 95-120 m; sandy bottom; 1.2 m Agassiz trawl; 1.vi.1981.— **Madeira.**— 2 specimens (RMNH D 46241): CANCAP sta. 3.060; SE of Madeira, 32°42'N 16°44'W; depth 70-100 m; rectangular dredge; 20.x.1978.— **Canary Islands.**— 1 ♀ (RMNH D 46237): Sta. CANCAP 4.071; SE of Lanzarote, 28°55'N 13°33'W; depth 70-80 m; sand and calcareous algae; triangular dredge; 20.v.1980.— **Cape Verde Islands.**— 1 ovigerous ♀ (RMNH D 46239): CANCAP sta. 6.109; S of Santa Luzia, 16°44'N 24°46'W; depth 55-80 m; calcareous algae and epifauna; 1.2 m Agassiz trawl; 16.vi.1982.

Distribution.— Known from Guinée (Holthuis, 1951), Gabon (Rossignol, 1962; Crosnier & Forest, 1973) and Annobon (Crosnier & Forest, 1973). Now recorded for the first time from the Azores, Madeira, Canary Islands and Cape Verde Islands.

Eualus occultus (Lebour, 1936)

Eualus occultus; Ledoyer, 1967: 419, tab. 2; Wirtz & Martins, 1993: 58.

Material.— **Azores.**— 2 specimens (RMNH D 46242): CANCAP sta. 5.029; E of Santa Maria, 37°00'N 25°02'W; depth 32 m; stone with brown algae; van Veen grab; 28.v.198.— 1 ♂, 1 juvenile (RMNH D 46244): CANCAP sta. 5.117; N of São Jorge, 38°38'N 27°55'W; depth 40-50 m; cobbles with algae; van Veen grab; 4.vi.1981.— 1 ♂, 4 juveniles (RMNH D 46246): CANCAP sta. 5.098; W of Pico, 38°33'N 28°32'W; depth 40 m; volcanic gravel, shell gravel and stone; van Veen grab; 2.vi.1981.— 4 specimens (RMNH D 46259); CANCAP sta. 5.116; N of São Jorge, 38°38'N 27°55'W; depth 20 m; cobbles with algae; van Veen grab; 4.vi.1981.— **Madeira.**— ca. 10 specimens (RMNH D 42544): S coast, Caniço de Baixo; under stones at 8-12 m depth; 1993; leg. et don. P. Wirtz.— 1 specimen (RMNH D 45630): SW coast, at Ponta Atalaia; depth 20 m; 13.vi.1994; scuba diving; on stem of *Telmatactis cricoides*; leg. P. Wirtz.— 1 ♀ (RMNH D 46253): CANCAP sta. 4.D16; Porto Santo, E coast of Baixo, 33°00'N 16°23'W; rocky coast; depth 5 to 20 m; scuba diving; 9.vi.1980.— 4 ♀ ♀ (3 ovigerous) (RMNH D 46254): CANCAP sta. 1.D66; SE coast of Madeira, Ponta de São Lourenço, near Ponta de Furado, 32°44'N 16°41'W; depth 0-30 m; scuba diving; 13.iii.1976.— ca. 10 specimens (RMNH D 46262): CANCAP sta. 3.060; SE of Madeira, 32°42'N 16°44'W; depth 70-100 m; rectangular dredge; 20.x.1978.— 1 ovigerous ♀ (RMNH D 46264): CANCAP sta. 1.D48; SE coast of Madeira, W of Caniçal, 32°44'N 16°44'W; depth 0-22 m; scuba diving; 11.iii.1976.— **Canary Islands.**— many specimens (RMNH D 46196): Tenerife, from under stones near "Las Galletas"; depth 16 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 8.— 3 specimens (RMNH D 46205): Tenerife, Playa Paraiso near Playa de las Americas; from a *Telmatactis*; depth 20 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 5.— 2 specimens (RMNH D 46221); Lanzarote, Puerto del Carmen; night dive; from under stones; depth 6 m; 15.iv.1995; leg. et don. P. Wirtz, vial 10.— 1 specimen (RMNH D 46260): CANCAP sta. 4.D03; S coast of Lanzarote, Arrecife, 28°57'N 13°33'W; rocky and sandy coast; depth to 15 m; scuba diving; 20,21.v.1980.— **Cape Verde Islands.**— 1 ♂, 1 ♀ (RMNH D 46243): CANCAP sta. 6.069; SW of Boa Vista, 15°52'N 13°00'W;

depth 76-90 m; calcareous algae; 1.2 m Agassiz trawl; 13.vi.1982.— 1 ♀ (RMNH D 46245): CANCAP sta. 6.110; S of Santa Luzia, 16°44'N 24°46'W; depth 60-80 m; coarse sand and shell gravel; 1.2 m Agassiz trawl; 16.vi.1982.— 1 specimen (RMNH D 46247): CANCAP sta. 7.125; S of Razo, 16°36'N 24°36'W; depth 85-130 m; calcareous algae (mostly dead); rectangular dredge; 1.ix.1986.— 3 specimens (RMNH D 46248): CANCAP 7.146; S of Branco, 16°40'N 24°42'W; depth 64 m; calcareous nodules with bryozoans; rectangular dredge; 4.ix.1986.— 1 ♀ (RMNH D 46249): CANCAP sta. 7.150; S of Branco, 16°37'N 24°38'W; depth 115 m; calcareous gravel and nodules; 1.2 m Agassiz trawl; 5.ix.1986.— 1 specimen (RMNH D 46250): CANCAP sta. 7.111; W of Sal, off Palmeira, 16°46'N 23°02'W; depth 90 m; antipatharians and sponges; 1.2 m Agassiz trawl; 31.viii.1986.— 4 specimens (RMNH D 46251): CANCAP sta. 7.047; SW of Maio, Ponta Inglez/Ponta Preta, 15°06'N 23°13'W; depth 75 m; calcareous nodules with hydroids; 1.2 m Agassiz trawl; 25.viii.1986.— 2 ♀♀, 12 juveniles (RMNH D 46252): CANCAP sta. 7.125; S of Razo, 16°36'N 24°36'W; depth 85-130 m; calcareous algae (mostly dead); rectangular dredge; 1.ix.1986.— 1 ovigerous ♀ (RMNH D 46255): CANCAP sta. 7.107; W of Sal, off Palmeira, 16°45'N 23°00'W; depth 70 m; calcareous nodules; 1.2 m Agassiz trawl; 30.viii.1986.— 2 specimens (RMNH D 46256): CANCAP 7.151; S of Branco, 16°38'N 24°41'W; depth 75 m; hard bottom, scraped bryozoans and antipatharians with epizoa; 1.2 m Agassiz trawl; 5.ix.1986.— 4 ♀♀, 2 ♂♂ (RMNH D 46257): CANCAP sta. 7.107; W of Sal, off Palmeira, 16°45'N 23°00'W; depth 70 m; calcareous nodules; 1.2 m Agassiz trawl; 30.viii.1986.— 6 specimens (RMNH D 46258): CANCAP sta. 7.115; S of Razo, 16°36'N 24°36'W; depth 80 m; calcareous sand, gravel and nodules with Foraminifera; van Veen grab; 1.ix.1986.— 2 ♀♀ (1 ovigerous) (RMNH D 46261): CANCAP sta. 7.146; S of Branco, 16°40'N 24°42'W; depth 64 m; calcareous nodules with bryozoans; rectangular dredge; 4.ix.1986.

Remarks.— Some specimens (RMNH D 46251, 46259 and 46262) have 3 pairs of dorsal spines on the telson like in *E. gracilipes*. However, in these specimens the stylocerite is as long as the basal antennular segment, and the pterygostomial angle rounded, which are characters of *E. occultus*. In the juvenile specimens the stylocerite does not reach the end of the basal segment of the antennular peduncle. In adults it clearly reached beyond the end of the basal segment of the antennular peduncle.

This small shrimp is very frequently found at the coast of Madeira below stones in a depth range of at least 6 to 35 m. It also is sometimes encountered on the stem of the large sea anemone *Telmatactis cricoides*, together with many other symbiotic crustaceans (Wirtz, in print).

Geographic distribution.— The collection of the Museu Municipal do Funchal contains a specimen of *Eualus occultus* identified by Manuel Bischoit (MMF 23740), but this record was never published. Further specimens have now been deposited in the collection of the Museu Municipal do Funchal (MMF 25717, 25746, 25747). *Eualus occultus* has already been recorded from Madeira by Ledoyer (1967), but the species is not listed for Madeira in, for example, Noël, 1992. The species is now recorded for the first time from the Canary Islands and the Cape Verde Islands. *Eualus occultus* ranges from Bergen (Norway) southwards into the Mediterranean (Smaldon et al. 1993) and has recently also been recorded from the Azores (Wirtz & Martins, 1993). With the present records, its known distribution is extended in southern direction.

Hippolyte garciaraso d'Udekem d'Acoz, 1996

Hippolyte garciaraso d'Udekem d'Acoz, 1996a: 16-27, figs. 5-6, 8-10.

Material.— **Canary Islands**.— 5 specimens (RMNH D 46199): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 1.— ca. 12 specimens (RMNH

D 46200): Tenerife, Playa Paraiso near Playa de las Americas; among plants; depth 14 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 4.— many specimens (RMNH D 46201): Tenerife, Playa Paraiso near Playa de las Americas; in seagrass meadow (*Cymodocea nodosa*) near "Las Galletas"; depth 18 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 7.— 2 specimens (RMNH D 46202): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 9.— 4 specimens (RMNH D 46203): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 20.— 2 specimens (RMNH D 46204): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 22.— 3 specimens (RMNH D 46206): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 17.— 1 specimen (RMNH D 46222): Lanzarote, Puerto del Carmen; night dive; from under stones; depth 6 m; 15.iv.1995; leg. et don. P. Wirtz, vial 10.— 1 specimen (RMNH D 46224): Gran Canaria, "Mulle de Arenaga"; night dive; depth ca. 7 m; 11.iv.1995; leg. et don. P. Wirtz.— many specimens (RMNH D 46226): Gran Canaria, harbour of Pasito Blanco; *Cymodocea nodosa* meadow; depth ca. 9 m; 12.iv.1995; leg. et don. P. Wirtz, vial no. 6.— 1 specimen (RMNH D 46232): Sta. GC88.08; Canary Islands, Gran Canaria, Arinaga, near harbour entrance, 27°51'N 15°24'W; 1.vi.1988; littoral zone with tidepools and large and small boulders on sandy and rocky bottoms; handcollecting by turning boulders, handnets.

Remarks.— The present species and *H. leptocerus* are very similar. Distinguishing between the species is difficult, especially in small specimens. d'Udekem d'Acoz (1996a) gives the distinguishing characters in his key to the East Atlantic and Mediterranean species of *Hippolyte* (pp. 7-11). This key can only be applied to specimens over 7 mm total length. The adult specimens of the Canary Islands population all fall within the diagnosis given for *H. garciaraso* by d'Udekem d'Acoz, 1996a. Data based on external morphology only, do not provide conclusive evidence for the separation of this *leptocerus-garciasoi*-complex into two species. More arguments on the specific status of these species could come from hybridization experiments. For the time being however, the separation in two species is followed here.

Geographic distribution.— *H. garciaraso* was first described from the eastern Atlantic coast between Morocco and the Bay of Biscay, and from several localities in the Mediterranean Sea. The specimens from the Canary Island constitute the southernmost record of the species. Both *H. leptocerus* and *H. garciaraso* have the same general geographic distribution. The species however, are usually found in allopatric populations. d'Udekem d'Acoz (1996a) however, did find both species sympatric at Banyuls. This fact lead him to the conclusion that two species are involved, leading to the description of a new species: *H. garciaraso*. The distribution of both species in the Macaronesian Islands also seems to be allopatric, as *H. garciaraso* is now recorded for the first time from the Canary Islands where *H. leptocerus* has not been observed. *H. leptocerus* has been recorded from both Madeira and the Cape Verde Islands where *H. garciaraso* has not been recorded. This patterns seems difficult to explain with two species involved.

Hippolyte leptocerus (Heller, 1836)

Hippolyte leptocerus; d'Udekem d'Acoz, 1996a: 40-54, figs. 7, 17-23 (full synonymy).

? *Hippolyte gracilis*; Ledoyer, 1967: 419, tab. 2.

Material.— **Madeira**.— 1 specimen (RMNH D 42895): in front of the Lido do Funchal; depth 8 m; under stone; xi.1993; leg. et don. P. Wirtz.— 2 specimens (RMNH D 42896): CANCAP sta. 3.K04; NE

coast of Madeira, Porto de Moniz, 32°52'N 17°10'W; coastal swimming pool; 11,12,x,1978.— 1 juvenile (RMNH D 42987): CANCAP sta. 3.K01; SE coast of Madeira, Caniçal, 32°44'N 16°44'W; rocky littoral, pools; shallow sub-littoral; 7/8/14.x.1978.— 2 specimens (RMNH D 46966): Caniço de Baixo, in front of the Roca Mar Hotel; depth ca. 20 m; dense growth of the brown alga *Styopodium zonale*; end September of beginning of October 1994; leg. et don. P. Wirtz.— ca. 12 specimens (RMNH D 46967): Santa Cruz; depth 5 m; between plants; beginning of October 1994; leg. et don. P. Wirtz.— **Cape Verde Islands.**— 1 ovigerous ♀ (RMNH D 42897): CANCAP sta. 7.D08; Sal, S coast near Santa Maria, 16°35'N 22°55'W; depth 0-15 m; scuba diving; 29.viii.1986.

Geographic distribution.— Ledoyer (1967) recorded a specimen of "*Hippolyte gracilis*" from Madeira. This specimen might be conspecific with *H. leptocerus*. This record has apparently gone largely unnoticed as the species is not listed for Madeira in, for example, Noël, 1992. d'Udekem d'Acoz (1996a) recorded the species from Madeira and the Cape Verde Islands. *Hippolyte leptocerus* has previously been recorded from western Ireland to Morocco, the western Mediterranean, the Adriatic, and the Black Sea. (See also under *H. garciaraso*).

Hippolyte ? leptocerus (Heller, 1863)

Material.— **Canary Islands.**— 1 juvenile (RMNH D 37538): Tenerife, Punta del Hidalgo; 23.x.1988; rockpools; leg. J. Stock.

Distinguishing characters in juveniles of *Hippolyte* species are not reliable (d'Udekem d'Acoz, 1996a). The present juvenile specimen has a very small rostrum with one postorbital spine, like in *H. leptocerus* figured in d'Udekem d'Acoz (1996a: fig. 17b), it could however also be a juvenile of *H. garciaraso* with an aberrant rostrum. If this specimen turns out to be *H. leptocerus*, it would be the first specimen recorded from the Canary Islands. (See also under *H. garciaraso*).

Hippolyte varians Leach, 1814

Hippolyte varians; Wirtz, 1995: 103 photo; d'Udekem d'Acoz, 1995: 497-499, figs. 2, 4; d'Udekem d'Acoz, 1996a: 90-107, figs. 29b, 44-50 (full synonymy).

Material.— **Azores.**— (RMNH D 42986): CANCAPsta. 5.099; Azores, W of Pico, 38°33'N 28°32'W; depth 30 m; algae; rectangular dredge; 2.vi.1981.— **Madeira.**— 1 specimen (RMNH D 42999): Funchal, sheltered little bay in front of Clube Naval; depth 13 m; scuba-diving; collected with hand-held plankton-net; between patches of *Cymodocea nodosa*; 27.xii.1993; leg. et don. P. Wirtz.— ca. 20 specimens (RMNH D 46893): Caniço de Baixo, in front of the Roca Mar Hotel; dense growth of the brown alga *Styopodium zonale*; 12.ix.1994; leg. et don. P. Wirtz.— ca. 30 specimens (RMNH D 47905): Caniço de Baixo, in front of the Roca Mar Hotel; dense growth of the brown alga *Styopodium zonale*; end of September or beginning of October 1994; leg. et don. P. Wirtz.— 10 specimens (RMNH D 46897): south coast, bay of Machico; meadow of *Cymodocea nodosa*; depth 12 m; -.iv.1994; leg. et don. P. Wirtz.— **Canary Islands.**— 1 small ♂ (RMNH D 42984): CANCAP sta. 4.097; E of Lanzarote, 29°08'N 13°26'W; depth 50-60 m; 1.2 m Agassiz trawl; 22.v.1980. — 1 small ♂ (RMNH D 42985): CANCAP sta. 2.044; SE of Fuerteventura, Punta de Gran Tarajal, 28°11'N 14°00'W; depth 49 m; calcareous and other algae; triangular dredge; 27.viii.1977.— 5 specimens (RMNH D 46228): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 1.

Remarks.— The species is common not only in seagrass meadows (*Cymodocea nodosa*) at various spots along the south coast of Madeira, but also on the alga *Styppodium zonale* that covers large areas in a depth range of 10-20 m along the south coast of Madeira.

When collecting shrimps associated with the black coral *Antipathes wollastoni* at Monte da Guia, Faial Islands, Azores, the second author captured a single specimen of *H. varians* on an *Antipathes* bush in 32 m depth. It is, however, not entirely clear, if this animal was living on the black coral itself or on plants partially covering the black coral. The specimen is now in the private collection of d'Udekem d'Acoz.

A colour photo of a Madeiran animal appeared in Wirtz (1995). The species usually occurs among algae in the litoral zone to depths of ca. 50 m.

Geographic distribution.— *Hippolyte varians* has been recorded from Madeira in 1967, by Ledoyer: 419, tab. 2. Recently d'Udekem d'Acoz (1996a) reported the species from the Azores and Canary Islands. No specimens are present in the CANCAP-collections made at the Cape Verde Islands. The species is known from Norway and the Faeroe Islands south to Algarve, Portugal, and the Mediterranean Sea. Lagardère (1971: 89) recorded *H. varians* from Morocco, but d'Udekem d'Acoz (1996a: 95) suspects that these Moroccan specimens could belong to *H. lagarderei* d'Udekem d'Acoz, 1995.

Latreutes fucorum (Fabricius, 1798)

Latreutes ensiferus; Stimpson, 1860: 27.

Latreutes fucorum; Bate, 1888: 583, pl. 104 fig. 1; Stebbing, 1914: 290; Holthuis, 1949: 239-240; Sivertsen & Holthuis, 1956: 31-32, pl. I figs. 1, 2; Pérez Sánchez, J.M. & E. Moreno Batet, 1991: 24; González Sánchez, 1995: 79.

Hippolyte ensiferus; Stebbing, 1910: 390; Lenz & Strunck, 1914: 322.

Material.— **Canary Islands.**— 1 specimen (RMNH D 46186): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 1.— many specimens (RMNH D 46187): Tenerife, seagrass meadow (*Cymodocea*) near "Las Galletas"; depth 18 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 7.— 1 specimen (RMNH D 46188): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 20.

Remarks.— Typical inhabitant of Gulfweed.

Geographic distribution.— Reported from the Atlantic Ocean from near Newfoundland to the West Indies, Bermuda, the Azores (Bate, 1888; Lenz & Strunck, 1914), Canary Islands (Holthuis, 1949; Pérez Sanchez & Moreno Batet, 1991; González Pérez, 1995), Cape Verde Islands (Stebbing, 1914). No records are known from Madeira.

Family Processidae

Processa robusta Nouvel & Holthuis, 1957 (figs 1-2)

Processa robusta Nouvel & Holthuis, 1957: 19-23, figs. 53-80; Crosnier, 1971: 580; Noël, 1986: 297 (key).

Material.— **Canary Islands.**— 1 specimen (RMNH D 46225): Gran Canaria, "Mulle de Arenaga";

night dive; depth ca. 7 m; 11.iv.1995; leg. et don. P. Wirtz, vial no. 4.— 1 ovigerous ♀ (RMNH D 47418): Sta. CANCAP 2.K19; N coast of Gran Canaria, Las Palmas, Las Canteras, 28°08'N 15°27'W; rocks, stones and sand, sub-littoral; depth 0-6 m; 14,15,17.ix.1977.— 1 specimen (RMNH D 47426): Sta. CANCAP 4.K07; N coast of Gran Canaria near Guia, 28°10'N 15°38'W; rockflat, tide pools; 5.v.1980.— **Mauritania**.— many specimens (RMNH D 47417): Sta. MAU.073; off Banc d'Arguin, 20°03'N 17°09'W; depth 19 m; hard calcareous bottom, hydroids, gorgonians, gastropods, hermitcrabs, opisthobranchs, echinoids; 1.2 m Agassiz trawl; 13.vi.1988.

Remarks.— Specimens clearly belong to the *Processa edulis* group, comprising *P. edulis* (Risso, 1816) with 3 subspecies: *edulis*, *arcassonensis* and *crassipes*, *P. robusta* Nouvel & Holthuis, 1957 and *P. compacta* Crosnier, 1971.

The specimens have the merus of right second pereopod with 9-11 segments, the carpus with 18-24 segments, the meral-carpal articulation does not reach beyond the distal margin of the scaphocerite.

Geographic distribution.— *Processa robusta* has been recorded from the western Mediterranean. It is now recorded from the Canary Islands and Mauritania for the first time. With these records the known range of the species is extended to the south.

Processa modica carolii Williamson, 1979
(figs 3-4)

Processa modica carolii Williamson, 1979: 21-23, figs. 2f-h, 3h, i, 6a, d, g.

Material.— **Madeira**.— 1 ♀ (RMNH D 47340): Sta. CANCAP 3.016, S of Porto Santo, 33°02'N 16°22'W; depth 24 m; sand; Hamon grab; 15.x.1978.— **Canary Islands**.— 1 specimen (RMNH D 45627): NE part of Gran Canaria, Puerto de Sardina; sandy bottom; depth 12 m; caught at night, -.vii.1994; scuba diving; leg. P. Wirtz.— 4 specimens (RMNH D 46220): Lanzarote, Puerto del Carmen; night dive; depth 12 m; 15.iv.1995; leg. et don. P. Wirtz, vial 10.— 1 ♂ (RMNH D 47341): Sta. CANCAP 2.021, S of Fuerteventura, Punta de Jandia, 28°03'N 14°30'W; depth 40-70 m; fine yellow sand and shell gravel; Van Veen grab 2x; 25.viii.1977.— 1 ♂ (RMNH D 47341): Sta. CANCAP 2.021, S of Fuerteventura, Punta de Jandia, 28°03'N 14°30'W; depth 40-70 m; fine yellow sand and shell gravel; Van Veen grab 2x; 25.viii.1977.— 1 ovigerous ♀ (RMNH D 47360): Sta. CANCAP 2.025: S of Fuerteventura, Punta de Jandia, 28°03'N 14°29'W; depth 38-100 m; sandy bottom; 1.2 m Agassiz trawl 4x; 25.viii.1977.— **Cape Verde Islands**.— 10 specimens (RMNH D 47362): Sta. CANCAP 6.086, S of Sao Nicolau, 16°34'N 24°24'W; depth 185-300 m; hard bottom; rectangular dredge; 14.vi.1982.— **Morocco**.— 1 specimen (RMNH D 47352): Sta. CANCAP 1.123, Morocco, off Cape Hadid, 31°58'N 09°54'W; depth 89 m; sandy clay; Van Veen grab 5x; 25.iii.1976.— **Mauritania**.— 1 specimen (RMNH D 47434): Sta. MAU.039, off Mauritania, 18°48'N 16°43'W; depth 260-280 m; muddy bottom, tubeworms, shrimps, fishes (scorpaenids & macrourids dominating); 3.5 m Agassiz trawl; 10.vi.1988.

Remarks.— Specimens possess the diagnostic characters for the subspecies as given by Williamson & Rochaburanon (1979). The fifth abdominal pleura are rounded. The pleura of the sixth abdominal segments have a strong postero-ventral tooth about half the length of the lateral plate. The stylocerite has a median outer distal tooth, the distal margin projects slightly beyond the outer distal tooth.

Geographic distribution.— Known from the Mediterranean and the Atlantic coast of southwest Spain. This is the first record of the species and subspecies from Madeira, Canary Islands, Cape Verde Islands, Morocco and Mauritania. With these records, the known range of the species is extended to the south.

Processa parva Holthuis 1951
(figs 5-6)

Processa parva Holthuis, 1951: 47, fig. 8; Crosnier & Forest, 1973: 182, 183, fig. 57c; Williamson & Rochanaburanon, 1979: 12, 14, fig. 3a-c.

Material.— **Azores**.— 1 ♂ (RMNH D 47342): Sta. CANCAP 5.088, E of Faial, 38°31'N 28°36'W; depth 50-60 m; calcareous stones; rectangular dredge; 1.vi.1981.— **Selvages archipelago**.— 1 ovigerous ♀ (RMNH D 47359): Sta. CANCAP 3.082, S of Selvagem Pequena, 30°01'N 16°01'W; depth 104 m; fine white sand; Van Veen grab; 22.x.1978.— **Canary Islands**.— 1 specimen (RMNH D 47350): Sta. CANCAP 4.073, SE of Lanzarote, 28°57'N 13°33'W; depth 48 m; coarse sand; Hamon grab; 20.v.1980.— 1 ♂ (RMNH D 47353): Sta. CANCAP 4.002, Canary Islands, S of Lanzarote, 28°50'N 13°49'W; depth 36 m; sand; Van Veen grab 3x; 14.v.1980.— 1 ovigerous ♀ (RMNH D 47354): Sta. CANCAP 4.029, S of Lanzarote, 28°48'N 13°48'W; depth 30-31 m; sand and shell gravel with calcareous algae; Van Veen grab; 15.v.1980.— 1 ovigerous ♀ (RMNH D 47355): Sta. CANCAP 2.011, S of Fuerteventura, Punta de Jandia, 28°02'N 14°29'W; depth 125 m; sand; Van Veen grab; 24.viii.1977.— 1 ovigerous ♀ (RMNH D 47356): Sta. CANCAP 2.032, S of Fuerteventura, Punta de Jandia, 28°11'N 14°01'W; depth 40 m; Van Veen grab 2x; 26.viii.1977.— 1 ♂, 1 ovigerous ♀ (RMNH D 47361): Sta. CANCAP 4.006, S of Lanzarote, 28°50'N 13°50'W; depth 30 m; sand with calcareous algae; Van Veen grab 3x; 14.v.1980.— 1 specimen (RMNH D 47433): Sta. CANCAP 2.044, SE of Fuerteventura, Punta de Gran Tarajal, 28°11'N 14°00'W; depth 49 m; calcareous and other algae; triangular dredge; 27.viii.1977.— **Cape Verde Islands**.— 1 ovigerous ♀ (RMNH D 47357) Sta. CANCAP 6.075, SW of Boa Vista, 15°55'N 23°04'W; depth 90 m; sand; rectangular dredge; 13.vi.1982.— 1 specimen (RMNH D 47376): Sta. CANCAP 7.046, SW of Maio, Ponta Inglez/Ponta Preta, 15°07'N 23°13'W; depth 70 m; calcareous red algae; 1.2 m Agassiz trawl; 25.viii.1986.— 3 specimens (RMNH D 47422): Sta. CANCAP 6.075, SW of Boa Vista, 15°55'N 23°04'W; depth 90 m; sand; rectangular dredge; 13.vi.1982.— 3 specimens (RMNH D 47430): Sta. CANCAP 6.075, SW of Boa Vista, 15°55'N 23°04'W; depth 90 m; sand; rectangular dredge; 13.vi.1982.— 1 specimen (RMNH D 47431): Sta. CANCAP 7.D14, Branco, S coast near Ponta de Parede, 16°39'N 24°41'W; sandy bottom, rock ledges; depth 12-15 m; scuba diving; 4,5.ix.1986.— 1 specimen (RMNH D 47432): Sta. CANCAP 6.004, S of Sao Tiago, 14°54'N 23°30'W; depth 63-58 m; sand and shell gravel; Van Veen grab 3x; 5.vi.1982.

Remarks.— Specimens possess the diagnostic characters for the species as given by Williamson & Rochanaburanon (1979). The fifth abdominal pleura are as figured by Holthuis (1951: 8b). The pleura of the sixth abdominal segments have the postero-ventral margin with a very short tooth. The outer distal tooth of the stylocerite is rather strong, overreaching the distal margin which is almost straight. No clear inner distal tooth is present.

Geographic distribution.— According to Williamson & Rochanaburanon (1979: 12) the species is known from the coast of West Africa between 29°N and 2°S. The present records are the first records of the species for the Azores, Canary Islands and Cape Verde Islands, and extend the known geographical range of the species to the north.

Family Palaemonidae

Palaemon serratus (Pennant, 1777)

Palaemon serratus; Holthuis, 1949: 241; Bischoito, 1985: 1-2; Pérez Sánchez & Moreno Batet, 1991: 132; Gonzalez Pérez, 1995: 69, fig. 13.

Material.— **Madeira**.— 1 ovigerous ♀ (RMNH D 42687): Caniço de Baixo, in front of Hotel Roca Mar; depth 2 m below low water; in large cave; scuba-diving; vii.1993; leg. et don. P. Wirtz.

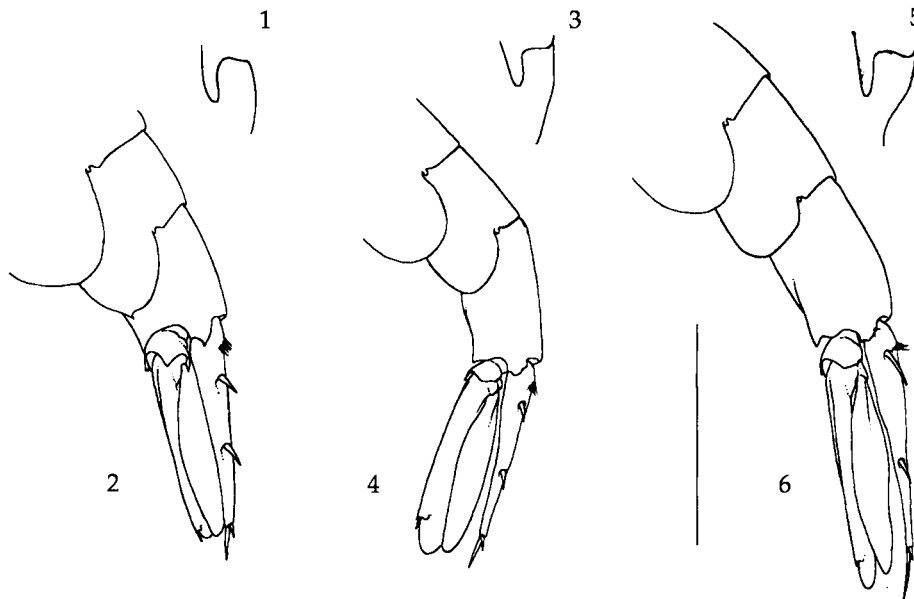
Remarks.— Biscoito (1985) reported this species from Madeira. His single specimen was caught near the town pier of Funchal and the author mentions the possibility that the animal was transported on the hull of a ship that connects Madeira with ports of Europe, particularly with continental Portugal, where the species is common. A further adult *Palaemon serratus* has now been caught in a cave at Caniço de Baixo, about 15 km east of Funchal. The large distance from the harbour and the fact that this animal is an ovigerous female suggests that this is not only a chance introduction but that there is a resident population of the species at Madeira.

Geographic distribution.— *Palaemon serratus* is known from the Danish coast southward to Mauritania and the Canary Islands (Holthuis, 1949; Pérez Sanchez & Moreno Batet, 1991; Gonzalez Pérez, 1995) and from the Mediterranean and the Black Sea.

Palaemon xiphias Risso, 1816

Palaemon xiphias; Holthuis, 1949: 241; Pérez Sánchez & Moreno Batet, 1991: 132.

Material.— **Madeira**.— 1 ovigerous ♀ (RMNH D 42692): Machico; 9 m depth; from seagrass meadow; scuba-diving; 17.vii.1993; hand-held plankton net; leg. et don. P. Wirtz.



Figs. 1-6. 1-2; *Processa modica carolii* Williamson, 1979, RMNH D 47340; 3-4, *Processa parva* Holthuis, 1951, RMNH D47342; 5-6, *Processa robusta* Nouvel & Holthuis, 1957, RMNH D 47417; 1, 3, 5, right stylocerite in dorsal view; 2, 4, 6, posterior part of abdomen in lateral view. Scale: 1, 3, 5, = 1 mm; 2, 4, 6 = 4 mm.

Palaemon xiphias is known from the Mediterranean Sea and from the Canary Islands (Holthuis, 1949; Pérez Sánchez & Moreno Batet, 1991). This is the first record of the species from Madeira.

Palaemonella atlantica Holthuis, 1951

Palaemonella atlantica Holthuis, 1951: 152, fig. 31; Rossignol, 1962: 130; Türkay, 1982: 105.

Material.— **Canary Islands.**— 1 ovigerous ♀ (RMNH D 45626): SW Tenerife, Playa Paraiso, ca. 25 km NE of Los Christianos; depth 15 m; -vii.1994; from stem of *Telmatactis cricoides*; scuba diving; leg. P. Wirtz.— **Cape Verde Islands.**— 1 specimen (RMNH D 32450): Ilha Brava, Porto de Faja; depth 2 m; rocks with algae; 4.ix.1979. leg. E. Goodburn; Cambridge Expedition to St. Paul Rocks. Sta. 5-4.— 1 ♂, 1 ovigerous ♀ (RMNH D 47346): Sta. CANCAP 7.D09, SaL, W coast, Baia dar Palmeira. 16°45'N 23°00'W; vertical cliff down to 8 m, steep slope down to 25 m; scuba diving; 30,31.viii.1986.— 1 ovigerous ♀ (RMNH D 47347): Sta. CANCAP 6.067, SE of Boa Vista, 15°55'N 23°00'W; depth 58-62 m; calcareous algae; *Vermetes* and sponges; 1.2 m Agassiz trawl; 13.vi.1982.— 1 ovigerous ♀ (RMNH D 47348): Sta. CANCAP 6.146, SW of Sao Vicente, 16°48'N 25°06'W; depth 75 m; coarse sand and sponges; 1.2 m Agassiz trawl; 20.vi.1982.

Remarks.— It seems likely that the species lives associated with coelenterates, as the specimen from the Canary Islands was found on the club-tipped sea anemone *Telmatactis cricoides* and the Cape Verdean specimen, referred to by Türkay (1982), from the Antipatharian *Antipathes*.

Geographic distribution.— *Palaemonella atlantica* has previously been recorded from the Cape Verde Islands (Holthuis, 1951; Türkay, 1982), the type locality, and from Gabon (Rossignol, 1962). The species is now recorded from the Canary Islands for the first time.

Periclimenes wirtzi d'Udekem d'Acoz, 1996

Periclimenes wirtzi d'Udekem d'Acoz, 1996b: 133-149, figs. 1-7.

Periclimenes sp.; Wirtz, 1996d; 420 photo.

Material.— **Canary Islands.**— ca. 15 specimens (RMNH D 47339): Lanzarote, Puerto del Carmen; depth 54 m; ii.1996; on *Antipathes wallastoni* leg. et don. P. Wirtz.

Remarks.— *Periclimenes wirtzi* lives on black coral of the genus *Antipathes*.

Geographic distribution.— It has been recorded at Madeira and the Azorean Island Faial in a depth range of 29-40 m (d'Udekem d'Acoz, 1996b). The discovery of the species at Lanzarote, Canary Islands, on *Antipathes* bushes in 54 m depth extends the known geographic and depth range for this species.

Family Crangonidae

Philocheras bispinosus (Hailstone, 1835)

Philocheras bispinosus; Smaldon et al, 1993: 118, fig. 44;

Pontophilus mbizi Holthuis, 1952: 64, fig. 16; Holthuis, 1961: 26; Crosnier & Forest, 1973: 240.

Material.— **Madeira**.— 3 specimens (MMF 25748); no further data.— 2 specimens (MMF25749): no further data.— **Canary Islands**.— 4 specimens (RMNH D 46207): Tenerife, Playa Paraiso near Playa de las Americas; from sand; depth 20 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 2.— 4 specimens (RMNH D 46208): Tenerife, Playa Paraiso near Playa de las Americas; from seagrass meadow (*Cymodocea nodosa*) near "Las Galletas"; depth 18 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 7.— 9 specimens (RMNH D 46209): Tenerife, Playa Paraiso near Playa de las Americas; under stones near "Las Galletas"; depth 16 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 8.— 7 specimens (RMNH D 46210): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 12.— 4 specimens (RMNH D 46211): Tenerife, Playa Paraiso near Playa de las Americas; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 13.— 5 specimens (RMNH D 46216): Lanzarote, Puerto del Carmen; from sand; depth 30 m; scuba diving; 14.iv.1995; leg. et don. P. Wirtz, vial 7.— 2 specimens (RMNH D 46219): Gran Canaria, harbour of Pasito Blanco; *Cymodocea nodosa* meadow; depth 9 m; scuba diving; 12.iv.1995; leg. et don. P. Wirtz, vial 6.— 8 specimens (RMNH D 41574): Sta. CANCAP 4.089: E of Lanzarote, 29°08'N 23°26'W; depth 45 m; coarse sand with green and red algae; triangular dredge; 22.v.1980.

Examined for comparison.— 12 paratype specimens (RMNH D 7863): S Angola, 5 miles SW of Pointa Albina, 15°57'S 11°40'E; depth 97 m; in stomach of *Raja miraletus* L.; 2.xii.1948; "Mbizi" exp. sta. 74; don. Museum Brussel.

Remarks.— Holthuis (1961) and Crosnier & Forest (1973) indicated that *P. mbizi* might be synonymous with *P. bispinosus*. Comparison of *P. mbizi* specimens with *P. bispinosus* specimens from the North Sea did not reveal any differences. *P. mbizi* (Holthuis, 1952) therefor is treated here as a junior synonym of *P. bispinosus* (Hailstone, 1835).

Geographic distribution.— *Philocheras bispinosus* has been recorded from Iceland, the Faeroe Islands and SW Norway southwards to the Azores, Cape Verde Islands and Angola and into the Mediterranean. It is now recorded for the first time from the Madeira and the Canary Islands.

Philocheras fasciatus (Risso, 1816)

Philocheras fasciatus; Bacescu, 1967: 174-176, fig. 85; Smaldon et al., 1993: 122, fig. 46.

Material.— **Canary Islands**.— 1 specimen (RMNH D 45628): SW part of Gran Canaria, Pasito Blanco; sandy bottom near *Cymodocea nodosa* meadow; depth 9 m; -vii.1994; scuba diving; leg. P. Wirtz.— 2 specimens (RMNH D 46197): Tenerife, in seagrass meadow (*Cymodocea nodosa*) near "Las Galletas"; depth 18 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 7.— 1 specimen (RMNH D 46217): Gran Canaria, harbour of Pasito Blanco; *Cymodocea nodosa* meadow; depth 9 m; scuba diving; 12.iv.1995; leg. et don. P. Wirtz, vial 6.

Geographic distribution.— The species had been recorded from Iceland to the Azores and into the western Mediterranean, Adriatic Sea (Smaldon et al., 1993) and the Black Sea (Bacescu, 1967). The new records from the Canary Islands apparently are the southernmost records of the species.

Philocheras trispinosus (Hailstone, 1835)

Pontophilus trispinosus; Ledoyer, 1967: 417.

Philocheras trispinosus; Smaldon et al., 1993: 126, fig. 48.

Material.— **Azores**.— 2 specimens (RMNH D 41578): Sta. CANCAP 5.025, E of Santa Maria, 36°59'N 25°03'W; depth 10-18 m; very fine, mainly volcanic, sand; Van Veen grab; 28.v.1981.— **Madeira**.— 1 specimen (RMNH D 45443): Funchal, sheltered little bay in front of Clube Naval; depth 13 m; Scuba-diving; collected with hand-held plankton-net; 27.xii.1993; between patches of *Cymodocea*; leg. et don. P. Wirtz.— **Canary Islands**.— 1 specimen (RMNH D 41579): Sta. CANCAP 4.007, S of Lanzarote, 28°50'N 13°50'W; depth 25-36 m; red algae, including calcareous algae; triangular dredge; 14.v.1980.— 1 specimen (RMNH D 46195): Tenerife, Playa Paraiso near Playa de las Americas; from sand; depth 20 m; scuba diving; 12-17.ii.1995; leg. et don. P. Wirtz, vial no. 2.— 3 specimens (RMNH D 46215): Gran Canaria, Muelle de Aranaga; night dive in a *Cymodocea* meadow; depth ca. 7 m; scuba diving; 11.iv.1995; leg. et don. P. Wirtz, vial 4.— 4 specimens (RMNH D 46218): Gran Canaria, harbour of Pasito Blanco; *Cymodocea* meadow; depth 9 m; scuba diving; 12.iv.1995; leg. et don. P. Wirtz, vial 6.

Geographic distribution.— Under the name *Pontophilus trispinosus*, Ledoyer (1967) already records this species from sandy bottoms of Madeira, but this has apparently gone largely unnoticed, and the species is not listed for Madeira in, for example, Noël, 1992. Additional specimens of *Philocheras trispinosus* were obtained from a sandy bottom at the south coast of Madeira at 10 to 22 m depth. An animal from 27 January 1993, deposited at the Museum Municipal do Funchal (MMF) is an ovigerous female.

Philocheras trispinosus is known from the North Sea southward to Morocco and the Mediterranean. It has also been recorded from the Azores and from the Canary Islands (Holthuis 1949, Smaldon et al. 1993).

Knowledge of many species of *Philocheras* in the eastern Atlantic and Mediterranean is fragmentary. The following species have been recorded: *P. aglyptus* Crosnier, 1971 (Congo), *P. bidens* Holthuis, 1951 (Portuguese Guinea to Angola), *P. bispinosus* (Hailstone, 1835) (Iceland, the Faroes and SW Norway southwards to the Azores, the Canary Islands, and the Mediterranean), *P. echinulatus* (Sars, 1862) (W Norway south to Morocco and the Mediterranean), *P. fasciatus* (Risso, 1816) (from Iceland southwards to the Canary Islands, and the Mediterranean), *P. gaillardii* Crosnier, 1971 (Congo), *P. monacanthus* (Holthuis, 1951) (Portugal and Mediterranean), *P. opici* Crosnier, 1971 (Annobon), *P. prionolepis* Holthuis, 1952 (Cape Verde Islands and Congo), *P. sculptus* (Bell, 1847) (from Scotland to South Africa and the Mediterranean), *P. trispinosus* (Hailstone, 1835) (from northern North Sea southwards to Mauritania, the Azores, Madeira, Canary Islands and the Mediterranean), *P. wolffi* Holthuis, 1951 (French Guinea).

Family Xanthidae

Pilumnus villosissimus (Rafinesque, 1814)

Pilumnus spinifer; Pérez Sánchez & Moreno Batet, 1981: 154, fig.

Pilumnus villosissimus; Fransen, 1991: 165-166; González Sánchez, 1995: 209, fig. 146; Wirtz, 1996c: 549 photo.

Not: *Pilumnus villosissimus*; Wirtz, 1995: 127 photo [= *Globopilumnus africanus* (A. Milne Edwards, 1867)].

Material.— **Azores**.— 1 specimen (RMNH D 40968): Sta. CANCAP 5.116, N of São Jorge. 38°38'N

27°55'W; depth 20 m; cobbles with algae; Van Veen grab; 4.vi.1981.— 8 specimens (RMNH D 38826): Sta. CANCAP 5.K10, N coast of Sao Jorge, Faja da Caldira, 38°38'N 27°56'W; cobble beach and lagoon; 4.13.vi.1981. — 1 specimen (RMNH D 38827): Sta. CANCAP 5.D07, SE coast of Faial near Horta, 38°31'N 28°37'W; rocky coast, S of harbour; depth to 15 m; scuba diving; 1/3,5.vi.1981. — 1 specimen (RMNH D 38828): Sta. CANCAP 5.D04, SW coast of Santa Maria, Ilhéu da Vila, 36°56'N 25°10'W; close to small island; depth to 15 m; scuba diving; 29,30.v.1981.— 1 specimen (RMNH D 38833): Sta. CANCAP 5.D05, S coast of Sao Miguel, Ilhéu da Vila, 37°42'N 25°27'W; close to small outlying volcano; depth to 15 m; scuba diving; 31.v.1981.— **Madeira**.— 3 ♀♀, 1 ♂ (RMNH D 31589): Sta. CANCAP 1.K12, N coast, Porto do Moniz, 32°52'N 17°10'W; rocky shore with large rock pool (piscina); 26.ii.1976.— 1 specimen (RMNH D 38835): Sta. CANCAP 3.K04, NE coast, Porto de Moniz, 32°52'N 17°10'W; coastal swimming pool; 11,12,x,1978.— 1 specimen (RMNH D 42690): Caniço de Baixo, in front of Hotel Roca Mar; depth 15 m below low water; from the stem of a large *Telmatactis cricoides*; scuba-diving; vii.1993; leg. et don. P. Wirtz.— **Selvagens**.— 1 specimen (RMNH D 38830): Sta. CANCAP 4.D08, Selvagem Grande, Enseada das Cagarras, 30°08'N 15°52'W; rocky coast, sheltered bay; depth to 15 m; scuba diving; 27.v and 6.vi.1980.— 1 specimen (RMNH D 40967): Sta. CANCAP 3.D06, S coast of Selvagem Grande, small bay in Enseada das Cagarras, 30°08'N 15°52'W; depth 5 to 20 m; scuba diving; 21.x.1978.— **Canary Islands**.— 5 specimens (RMNH D 32185): Sta. CANCAP 2.K07, E coast of Gran Canaria, Puerto de Arinaga, 27°52'N 15°23'W; rocky littoral, pools; 18.viii.1977.— 4 specimens (RMNH D 41682): Sta. GC88.06, Gran Canaria. Punta del Mato, near Arinaga, 27°51'N 15°24'W; 30.v.1988; abrasion platform, tidepools with sandy and rocky bottoms; handcollecting, handnets and snorkling; depth 0-2 m.— 4 specimens (RMNH D 38829): Sta. CANCAP 4.D01, S coast of Lanzarote, W of Punta Papagayo, 28°50'N 13°47'W; scuba diving and shore collecting in sheltered bay, depth to 15 m; 14/15.v.1980. — 1 specimen (RMNH D 38831): Sta. CANCAP 4.K12, SE coast of Lanzarote, Arrecife, 28°57'N 13°33'W; depth 0-2 m; rocky shore, tide pools, shallow sandy bay; 20, 21.v.1980.— 1 specimen (RMNH D 38832): Sta. CANCAP 4.K01, N coast of Gran Canaria, Las Palmas, Playa de las Canteras, 28°09'N 15°26'W; rocky areas, sandy lagoon; depth 0-5 m; 28/30.iv and 1,9.v.1980.— 1 specimen (RMNH D 38834): Sta. CANCAP 2.K21, E coast of Gran Canaria, Playa de la Laja, S of Las Palmas, 28°04'N 15°25'W; rocky littoral and rock pools; 15.ix.1977.— 2 specimens (RMNH D 38836): Sta. GC88.02, Gran Canaria, Punto del Mato, near Arinaga; 27°51'N 15°24'W; 26.v.1988; abrasionplatform with tidepools; handcollecting and snorkling; depth 0-3 m; RMNH-Gran Canaria Expedition.— 2 specimens (RMNH D 41680): Sta. GC88.08, Gran Canaria, Arinaga, near harbour entrance, 27°51'N 15°24'W; 1.vi.1988; littoral zone with tidepools and large and small boulders on sandy and rocky bottoms; associated with *Anemonia sulcata*.— 4 specimens (RMNH D 41681): Sta. GC88.05, Gran Canaria. Playa del Cabrón, near Arinaga, 27°52'N 15°24'W; 28.v.1988; abrasion platform with tidepools with rocky and sandy bottoms; handcollecting, handnets and snorkling; depth 0-2 m; associated with *Anemonia sulcata*.— 4 ovigerous ♀♀, 2 ♂♂ (RMNH D 41683): Sta. CANCAP 7.K33, Gran Canaria, NW coast, near Puerto de Las Nieves, 28°05'N 15°42'W; more or less protected natural basin on exposed side of small pier, sand, rocks, stones, shallow sub-littoral; depth 0-2.5 m; snorkeling; 15, 16.ix.1986.— 2 exuviae (RMNH D 46213), Lanzarote, Puerto del Carmen; depth 5 m; scuba diving; 14-21.iv.1995; leg. et don. P. Wirtz.

This species can be commonly encountered below stones in shallow water at the south coast of Madeira. During a survey of the crustaceans associated with the club-tipped anemone *Telmatactis cricoides*, the second author has repeatedly seen *Pilumnus villosissimus* at the stem of this large sea anemone (Wirtz, in print).

Pilumnus villosissimus is known as a Mediterranean species. It was first recorded from the Azores, Madeira, Selvagens and the Canary Islands by Fransen (1991). A colour photograph of the species was printed in Pérez Sánchez & Moreno Batet, 1991 under the name *Pilumnus spinifer*, and by Wirtz, 1996c.

Family Majidae

Inachus phalangium (Fabricius, 1775)

Inachus phalangium; Christiansen, 1969: 102-103, fig. 42; Manning & Holthuis, 1981: 293-294; Türkay, 1982: 98; Fransen, 1991: 119-120; Wirtz & Diesel, 1983: 209-234; Wirtz & Martins, 1993: 57; d'Udekem d'Acoz, 1994: 13; González Sánchez, 1995: 233-234, figs. 174-175; Wirtz, 1995: 119 photo.

Material.— **Azores**.— 1 specimen (RMNH D 40448): Sta. CANCAP 5.D05, S coast of Sao Miguel, Ilhéu da Vila, 37°42'N 25°27'W; close to small outlying volcano; depth to 15 m; scuba diving; 31.v.1981.— **Madeira**.— 1 specimen (MMF 25744): in front of the Lido do Funchal; depth 8 m; iv.1994; associated with *Anemonia sulcata*; leg. et don. P. Wirtz.— **Selvagens**.— 7 specimens (RMNH D 40449): Sta. CANCAP 3.D06, S coast of Selvagem Grande, small bay in Enseada das Cagarras, 30°08'N 15°52'W; depth 5 to 20 m; scuba diving; 21.x.1978.— **Canary Islands**.— 1 specimen (RMNH D 40450): Sta. CANCAP 4.059, SE of Lanzarote, 28°48'N 13°45'W; depth 420-475 m; sandy bottom; 1.2 m Agassiz trawl; 19.v.1980.— 1 specimen (RMNH D 45629): SW part of Tenerife, Playa Paraiso, about 25 km NE of Los Christianos; from *Anemonia sulcata*; depth 3 m; vii.1994; scuba diving; leg. P. Wirtz.

Remarks.— This species is common in shallow water both at Madeira and at the Canary Islands, where it lives mainly associated with the snakelocks anemone *Anemonia sulcata*, as described for Mediterranean populations (Wirtz & Diesel, 1983). At Madeira, it was also encountered in association with *Telmatactis cricooides* (see Wirtz, 1995, in print).

Geographic distribution.— Despite its commonness, *Inachus phalangium* has not yet been recorded from Madeira. It has been recorded from the Azores (Fransen, 1991; Wirtz & Martins, 1993), the Selvagens (Fransen, 1991) and the Canary Islands (Santalla, 1973; Fransen, 1991; González, 1995) *Inachus phalangium* has been recorded from the eastern Atlantic from about 60°N southward to the Cape Verde Islands, and the Mediterranean.

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References

Bacescu, M.C., 1967. Crustacea Decapoda.— Fauna republicii Socialise România 4 (9): 1-351, pls 1-2.

- Bate, C.S., 1888. Report on the Macrura collected by H.M.S. "Challenger" during the years 1873-76.— Report on the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873-76, Zoology, 24: i-xc, 1-942, figs. 1-76, pl. 1-150.
- Biscoito, M.J., 1985. First record of *Palaemon serratus* (Pennant, 1777) (Crustacea, Decapoda, Palaemonidae) in Madeira.— *Bocagiana* 83: 1-2.
- Christiansen, M.E., 1969. Decapoda Brachyura. Marine Invertebrates of Scandinavia 2: 1-143.— Universitets Forlaget, Oslo.
- Crosnier, A., 1971. Sur quelques Crustacés Décapodes ouest-africains nouveaux ou rarement signalés.— *Bulletin du Muséum national d'Histoire Naturelle* (3) 9 (Zoologie 9): 569-595, figs. 1-9.
- Crosnier A. & J. Forest, 1973. Les crevettes profonde de l'Atlantique oriental tropical.— *Faune Tropicale* 19: 1-409, figs. 1-121.
- Fransen, C.H.J.M., 1991. Preliminary report on Crustacea collected in the eastern part of the North Atlantic during the CANCAP and Mauritania expeditions of the former Rijksmuseum van Natuurlijke Historie, Leiden: 1-200, fig. 1.— Nationaal Natuurhistorisch Museum, Leiden.
- González Pérez, J.A., 1995. Catálogo de los Crustáceos Decápodos de las Islas Canarias: 1-282, figs. 1-190.— Publicaciones Turquesa S.L., Tenerife.
- Holthuis, L.B., 1949. The caridean Crustacea of the Canary Islands.— *Zoologische Mededelingen* 30 (15): 227-255, figs. 1-8.
- Holthuis, L.B., 1951. The caridean Crustacea of tropical West Africa.— *Atlantide Report* 2: 7-187, figs. 1-34.
- Holthuis, L.B., 1952. Crustacés Décapodes Macrures.— *Résultats scientifiques du Expédition océanographique belge dans les Eaux côtières africaines de l'Atlantique Sud (1948-1948)* 3 (2): 1-88, figs. 1-21.
- Holthuis, L.B. 1961. Report of a collection of Crustacea Decapoda and Stomatopoda from Turkey and the Balkans.— *Zoologische Verhandlungen Leiden* 47: 1-67, figs. 1-15, pls. 1-2.
- Lagardère, J.-P., 1971. Les crevettes des côtes du Maroc.— *Travaux de l'institut scientifique chérifien et de la faculté des Sciences, Rabat, serie Zoologie*, 36: 1-140, figs. 1-325.
- Land, J. van der, 1987. Report on the CANCAP-project for marine biological research in the Canarian - Cape Verdean Region of the North Atlantic Ocean (1976-1986). Part I. List of stations.— *Zoologische Verhandlungen Leiden* 74: 1-94, figs. 1-2.
- Ledoyer, M., 1967. Aperçu sur la faune vagile de quelques biotopes de l'archipel de Madere. Comparaison avec les biotopes mediterraneens homologues.— *Arquivos do Museu Bocage* (2a) 1 (19): 415-425.
- Lenz, H. & K. Strunck, 1914. Die Dekapoden der Deutschen Südpolar-Expedition 1901-1903. I. Brachyuren und Macruren mit Ausschluss der Sergestiden.— *Deutsche Südpolar-Expedition* 15: 261-345, figs. 1-5, pls. 12-22.
- Manning, R.B. & L.B. Holthuis, 1981. West African Brachyuran Crabs (Crustacea:Decapoda).— *Smithsonian Contributions to Zoology* 306: i-xii, 1-379, figs. 1-88.
- Noël, P., 1992. Clé préliminaire d'identification des Crustacea Decapoda de France et des principales autres espèces d'Europe. Collection patrimoines naturels 9, 1-145.— *Secrétariat de la Faune et de la Flore. Muséum national d'Histoire Naturelle, Paris.*
- Nouvel, H. & L.B. Holthuis, 1957. Les Processidae (Crustacea Decapoda Natantia) des eaux européennes.— *Zoologische Verhandlungen Leiden* 32: 1-53, pls. 1-29.
- Pérez Sanchez, J.M. & Moreno Batet, E., 1991. *Invertebrados Marinos de Canarias: 1-335, colourfigs.*— Ediciones del Cabildo Insular de Gran Canaria, Las Palmas de Gran Canaria.
- Rossignol, M., 1962. Catalogue des décapodes Brachyoures, Anomoures et Macroures littéraires en Collection au Centre d'Océanographie de Pointe-Noire.— *Travaux du centre océanographique de Pointe-Noire, ORSTOM*, 2 (5): 111-138.
- Sivertsen, E. & L.B. Holthuis, 1956. Crustacea Decapoda (the Penaeidea and Stenopodidea excepted).— Report on the scientific results of the "Michael Sars" North Atlantic deep-sea expedition, 1910, 5 (12): 1-54, figs. 1-32, pls. 1-4.
- Smaldon, G., L.B. Holthuis & C.H.J.M. Fransen, 1993. Coastal shrimps and prawns.— *Synopses of the British Fauna (New Series)*, 15, second edition: i-vii, 1-142, figs. 1-50.

- Stebbing, T.R.R., 1910. General Catalogue of South African Crustacea (Part V. of S.A. Crustacea, for the Marine Investigations in South Africa).— *Annals of the South African Museum* 6: 281-593, pls. 41-48.
- Stebbing, T.R.R., 1914. Stalk-eyed Crustacea Malacostraca of the Scottish national Antarctic expedition.— *Transactions of the royal society of Edinburgh* 50 (2): 253-307, pls. 23-32.
- Stimpson, W., 1860. Prodrômus descriptionis animalum evertibratorum, quae in Expeditione ad Oceanum Pacificum Setentionalem, a Republica Federata missa, Cadwaladaro Ringgold et Johanne Rodgers Ducibus, observavit et descripsit. VIII. Crustacea Macrura.— *Proceedings of the Academy of Natural Sciences of Philadelphia* 12: 22-47.
- Türkay, M., 1982. Marine Crustacea Decapoda von den Kapverdischen Inseln mit Bemerkungen zur Zoogeographie des Gebietes.— *Courier Forschungs-Institut Senckenberg* 52: 91-129.
- d'Udekem d'Acoz, C., 1994. Contribution à la connaissance des crustacés décapodes helléniques I: Brachyura.— *Bios* 1 (2): 9-47, figs. 1-4.
- d'Udekem d'Acoz, C., 1995. Sur trois *Hippolyte* de l'atlantique nord-oriental et de la méditerranée; *H. lagarderei* sp. nov., *H. varians* Leach, 1814 et *H. holthuisi* Zariquiey Alvarez, 1953 (Decapoda, Caridea).— *Crustaceana* 68 (4): 494-502, figs. 1-5.
- d'Udekem d'Acoz, C., 1996a. The genus *Hippolyte* Leach, 1814 (Crustacea, Decapoda, Caridea, Hippolytidae) in the East Atlantic Ocean and the Mediterranean Sea, with a checklist of all species in the genus.— *Zoologische Verhandlungen Leiden* 303: 1-133, figs. 1-50, tab. 1.
- d'Udekem d'Acoz, C., 1996b. Description of *Periclimenes wirtzi* sp. nov., a new pontonine shrimp from Madeira and the Azores, with a checklist of eastern Atlantic and Mediterranean Pontoninae (Crustacea, Decapoda, Caridea).— *Bulletin van het Koninklijk Belgisch Instituut voor Natuurwetenschappen, Biologie* 66: 133-149, figs. 1-7.
- Williamson, D.I. & T. Rochanaburanon, 1979. A new species of Processidae (Crustacea, Decapoda, Caridea) and the larvae of the north European species.— *Journal of Natural History* 13: 11-33, figs. 1-9.
- Wirtz, P., 1995. Unterwasserführer Madeira Kanaren Azoren Niedere Tiere - Underwater Guide Madeira Canary Islands Azores Invertebrates: 1-248, illustr.— S. Naglschmid Verlag, Stuttgart.
- Wirtz, P., 1996a. One vascular plant and ten invertebrates new for the marine fauna of Madeira.— *Arquipélago* 13A: 119-123. [for 1995]
- Wirtz, P., 1996b. Three shrimps, five nudibranchs, and two tunicates new for the marine fauna of Madeira.— *Boletim do Museu Municipal do Funchal* 46 (257): 167-172. [for 1994]
- Wirtz, P., 1996c. Die Zehnfüßkrebse der Kanaren.— *Die Aquarien- und Terrarien Zeitschrift (DATZ)* 49: 549.
- Wirtz, P., 1996d. Garnelen an Schwarzen Korallen.— *Die Aquarien- und Terrarien Zeitschrift (DATZ)* 49: 420-422.
- Wirtz, P., in print. Crustacean symbionts of the sea-anemone *Telmatactis cricoides* at Madeira and the Canary islands.— *Journal of Zoology*.
- Wirtz, P. & R. Diesel, 1983. The social structure of *Inachus phalangium*, a spider crab associated with the sea anemone *Anemonia sulcata*.— *Zeitschrift für Tierpsychologie* 62: 209-234.
- Wirtz, P. & H. Martins, 1993. Notes on some rare and little known marine invertebrates from the Azores - with a discussion of the zoogeography of the area.— *Arquipélago* 11A: 55-63.

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