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New records of decapod crustaceans from off the Archipelago of Madeira (Northeastern Atlantic)

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With 1 figure

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ABSTRACT: Ten decapod crustacean species belonging to the families Oplophoridae, Nematocarinidae, Hippolytidae, Pandalidae, Epialtidae, Inachidae and Majidae are recorded for the first time from the Archipelago of Madeira. The family Nematocarinidae, represented by *Nematocarcinus gracilis*, is recorded for the first time from the study area.

Keywords: Crustacea, Decapoda, Oplophoridae, Nematocarinidae, Hippolytidae, Pandalidae, Epialtidae, Inachidae, Majidae, new record, Madeira Island, seamounts, NE Atlantic Ocean.

RESUMO: No presente trabalho os autores assinalam, pela primeira vez, para o arquipélago da Madeira 10 novas espécies de crustáceos decápodes pertencentes às famílias Oplophoridae, Nematocarinidae, Hippolytidae, Pandalidae, Epialtidae, Inachidae e Majidae. A família Nematocarinidae, representada por *Nematocarcinus gracilis*, é assinalada pela primeira vez para a área de estudo.

Palavras-chave: Crustacea, Decapoda, Oplophoridae, Nematocarinidae, Hippolytidae, Pandalidae, Epialtidae, Inachidae, Majidae, novo assinalamento, ilha da Madeira, montes submarinos, Oceano Atlântico nordeste.

INTRODUCTION

Up to now, at least 175 species of decapod crustaceans have been recorded from the waters of the Archipelago of Madeira (ARAÚJO & CALADO, 2003; CALADO *et al.*, 2004; DOS SANTOS *et al.*, 2008; ARAÚJO *et al.*, 2009, 2013).

Following a series of research surveys around the Archipelago of Madeira, including some seamounts located between these islands and Portugal mainland (ARAÚJO *et al.*, 2008), as well as an in-depth search on the collections of the Funchal Natural History Museum (MMF), a lot of 10 species newly for the area were found and are reported herein.

MATERIAL AND METHODS

All studied specimens were collected within the 200-mile Economic Exclusive Zone of Madeira, and were captured with baited bottom traps. They are all preserved in 70% ethanol in the collections of the MMF. In some cases photographs of the freshly caught specimens were taken. Specimens were measured according to standard carcinological procedures and sexed. The systematic arrangement of the present account follows DE GRAVE *et al.* (2009).

Abbreviations used:

CL – Carapace length; CW – Carapace width.

SYSTEMATICS

Family Oplophoridae Dana, 1852

Kemphyra corallina (A. Milne-Edwards, 1883)

Material examined: MMF 036158, 1 male, 30.29 mm CL, 1 ovigerous female, 29.73 mm CL, Unicorn Seamount, 34° 45' 26.33" N 14° 25' 19.78" W, ca. 2500 m, bottom trap, RECPROFMAD-1 cruise, leg 2, R/V Arquipélago, 25.10.2004; MMF 036162 (Fig. 1A), 2 non-ovigerous females, 22.91-22.92 mm CL, 1 ovigerous female, 21.47 mm CL, 1 male, 19.85 mm CL, Seine Seamount, 33° 44' 28.29" N 14° 19' 05.38" W, ca. 2500 m, bottom trap, RECPROFMAD-1 cruise, leg 1, R/V Arquipélago, 02.11.2004; MMF 036164, 1 male, 15.33 mm CL, Seine Seamount, 33° 44' 28.29" N 14° 19' 05.38" W, ca. 2500 m, bottom trap, RECPROFMAD-1 cruise, leg 2, R/V Arquipélago, 04.11.2004; MMF 036219, 1 male, 16.64 mm CL, Unicorn Seamount, 34° 45' 26.33" N 14° 25' 19.78" W, ca. 2500 m, bottom trap, RECPROFMAD-1 cruise, leg 2, R/V Arquipélago, 25.10.2004.

Remarks: *K. corallina* is the thirteenth Oplophoridae species recorded from the Archipelago of Madeira. FIGUEIRA

(1957) recorded nine species from these islands: *Acantheephyra curtirostris* Wood-Mason & Alcock, 1891, *Acantheephyra eximia* Smith, 1884, *Acantheephyra pelagica* (Risso, 1816), *Acantheephyra purpurea* A. Milne-Edwards, 1881, *Ephyrina figueirai* Crosnier & Forest, 1973, *Notostomus elegans* A. Milne-Edwards, 1881, *Oplophorus spinosus* (Brullé, 1839), *Systellaspis cristata* (Faxon, 1893) and *Systellaspis debilis* (A. Milne-Edwards, 1881). CROSNIER & FOREST (1973) recorded *Acantheephyra stylostratis* (Spence Bate, 1888) based on a specimen from "between Gibraltar and Madeira" (another specimen in MMF was collected "close to Madeira"), and FRANSEN (1991) recorded *Acantheephyra microphtalma* Smith, 1885, *Heterogenys microphtalma* (Smith, 1885) and *Meningodora mollis* Smith, 1882.

K. corallina has been recorded from the Bay of Biscay to South Africa and Southwest of the Azores, and from the Indian Ocean (D'UDEKEM D'ACÓZ, 1999). It is here recorded for the first time from the Archipelago of Madeira.

Family Nematocarinidae Smith, 1884

Nematocarinus gracilipes Filhol, 1884

Material examined: MMF 036708, 1 non-ovigerous female, 20.22 mm CL, Madeira Island, Cabo Girão, 32° 36.389' N 17° 02.260' W, ca. 750 m, bottom trap, CHACMAD-1 cruise, stn. 32, R/V Arquipélago, 21.10.2005; MMF 036591, 1 non-ovigerous female, 24.03 mm CL, Porto Santo Island, 33° 09.29' N 16° 20.3' W, ca. 750 m, bottom trap, CHACMAD-1 cruise, stn. 5, R/V Arquipélago, 05.10.2005; MMF 036593, 2 non-ovigerous females, 29.79-23.12 mm CL, Porto Santo Island, 33° 09.29' N 16° 20.3' W, ca. 750 m, bottom trap, CHACMAD-1 cruise, stn. 5, R/V Arquipélago, 05.10.2005; MMF 036614, 1 non-ovigerous female, 18.92 mm CL, Madeira Island, Seixal, 32° 51.974' N 17° 06.641' W, ca. 750 m, bottom trap, CHACMAD-1 cruise, stn. 17, R/V Arquipélago, 14.10.2005; MMF 036618, 1 non-ovigerous female, 19.23 mm CL, Porto Santo Island, 32° 01.48' N 16° 13.69' W, ca. 750 m, bottom trap, CHACMAD-1 cruise, stn. 12, R/V Arquipélago, 07.10.2005; MMF 036653 (Fig. 1B), 1 non-ovigerous female, 18.55 mm CL, Madeira Island, Paúl do Mar, 32° 42.673' N 17° 15.268' W, ca. 750 m, bottom trap, CHACMAD-1 cruise, stn. 29, R/V Arquipélago, 21.10.2005.

Remarks: *Nematocarinus gracilipes* has been recorded in the Eastern Atlantic from west of Portugal to Morocco, Canary Islands, Cape Verde Islands and Ascension Island (D'UDEKEM D'ACÓZ, 1999). The family Nematocarinidae is here recorded for the first time from the Archipelago of Madeira.

Family Hippolytidae Spence Bate, 1888

Ligur ensiferus (Risso, 1816)

Material examined: MMF 012116, 1 non-ovigerous female, 9.24 mm CL, Madeira Island, Funchal Bay, no depth data, bottom trap, 10.08.1957; MMF 012117, 1 non-ovigerous female, 10.33 mm CL, Madeira Island, Funchal Bay, no depth data, bottom trap, 10.08.1957; MMF 012118, 1 non-ovigerous female, 8.58 mm CL, Madeira Island, Funchal Bay, no depth data, bottom trap, 10.08.1957; MMF 012119, 1 non-ovigerous female, 8.44 mm CL, Madeira Island, Funchal Bay, no depth data, bottom trap, 10.08.1957; MMF 023246, 3 non-ovigerous females, 23.49, 17.62 and 18.66 mm CL, Madeira Island, Funchal Bay, 32° 37.4' N 16° 54' W, ca. 300 m, bottom trap, 21.07.1978; MMF 023925, 1 non-ovigerous female, 18.09 mm CL, and MMF 023926, 2 non-ovigerous females, 19.07-24.60 mm CL, Madeira Island, Funchal Bay, 32° 37.40' N 16° 54.00' W, ca. 300 m, bottom trap, 10.01.1986; MMF 023933, 2 non-sexed specimens due to lost pleopods, 14.11-17.12 mm CL, Madeira Island, Funchal Bay, 32° 37.40' N 16° 54.00' W, ca. 400 m, bottom trap, 16.01.1986; MMF 023938, 2 non-sexed specimens (lost pleopods), 16.48-16.63 mm CL, Madeira Island, Funchal Bay, 32° 37.15' N 16° 53.95' W, ca. 520 m, bottom trap, 17.01.1986; MMF 024259, 1 non-ovigerous female, 24.16 mm CL, and 3 non-sexed specimens (lost pleopods), 18.97, 17.87 and 15.22 mm CL, Madeira Island, Garajau, 32° 37.85' N 16° 52.76' W, ca. 300 m, bottom trap, 13.04.1988; MMF 024312, 5 non-ovigerous females, 26.34, 19.26, 13.74, 15.05 and 11.42 mm CL, and 3 non-sexed specimens (lost pleopods), 23.58, 15.85 and 14.12 mm CL, Madeira Island, Pináculo, 32° 37.88' N 16° 52.49' W, ca. 280 m, bottom trap, 12.01.1989; MMF 024316, 2 non-sexed (lost pleopods), 15.43-23.10 mm CL, Madeira Island, Pináculo, 32° 37.59' N 16° 51.72' W, ca. 360 m, bottom trap, 13.01.1989; MMF 024321, 1 non-ovigerous female, 12.88 mm CL and 1 non-sexed specimen (lost pleopods), 22.52 mm CL, Madeira Island, Pináculo, 32° 37.74' N 16° 52.49' W, ca. 400 m, bottom trap, 26.01.1989; MMF 025366, 5 ovigerous females, 21.66, 23.94, 23.42, 23.27 and 19.22 mm CL and 2 non-ovigerous females, 16.20 and 13.39 mm CL, Madeira Island, Funchal Bay, 32° 37.15' N 16° 53.95' W, ca. 500 m, bottom trap, 20.05.1992; MMF 025367, 1 ovigerous female, 23.76 mm CL, Madeira Island, Funchal Bay, 32° 37.40' N 16° 54.00' W, ca. 300 m, bottom trap, 20.05.1992; MMF 036156 (Fig. 1C), 1 non-ovigerous female, 21.88 mm CL, Porto Santo Island, Ilhéu de Fora, 33° 07.91' N 16° 15.69' W, ca. 500 m, bottom trap, RECPROFMAD-1 cruise, R/V Arquipélago, 24.10.2004; MMF 036547, 1 male, 14.57

mm CL, MMF 036601, 1 non-ovigerous female, 19.49 mm CL, MMF 036679, 1 non-ovigerous female, 23.27 mm CL, Madeira Island, Ponta do Tristão, 32° 55.898' N 17° 12.996' W, ca. 750 m, bottom trap, stn. 20, CHACMAD-1, cruise, R/V Arquipélago, 15.10.2005; MMF 036607, 1 non-ovigerous female, 19.39 mm CL, Madeira Island, Paúl do Mar, 32° 42.673' N 17° 15.268' W, ca. 750 m, bottom trap, stn. 29, CHACMAD-1 cruise, R/V Arquipélago, 20.10.2005; MMF 036686, 1 non-ovigerous female, 20.15 mm CL, Madeira Island, Cabo Girão, 32° 36.389' N 17° 02.260' W, ca. 750 m, bottom trap, stn. 32, CHACMAD-1 cruise, R/V Arquipélago, 21.10.2005; MMF 039025, 1 male and 1 non-ovigerous female, 16.67 and 18.06 mm CL, Madeira Island, Porto Moniz, 32° 43.95' N 17° 16.15' W, ca. 500 m, bottom trap, stn. 12, CHACMAD-3 cruise, F/V Baía de Câmara de Lobos, 22.04.2008; MMF 039036, 1 male, 15.00 mm CL, MMF 039040, 2 non-ovigerous females, 12.53-23.05 mm CL, MMF 039045, 1 non-ovigerous female, 17.98 mm CL, MMF 039049, 1 male, 17.00 mm CL, Madeira Island, Porto Moniz, 32° 53.62' N 17° 09.27' W, ca. 600 m, bottom trap, stn. 14, CHACMAD-3 cruise, F/V Baía de Câmara de Lobos, 23.04.2008; MMF 039073, 1 ovigerous female, 26.35 mm CL, Madeira Island, Calheta, 32° 42' N 17° 11.52' W, ca. 600 m, bottom trap, stn. 22, CHACMAD-3 cruise, F/V Baía de Câmara de Lobos, 03.05.2008.

Remarks: Until the present, ten Hippolytidae species have been recorded from the Archipelago of Madeira. *Lysmata grabhami* (Gordon, 1935) was originally described from Madeira. LEDOYER (1967) recorded three species: *Eualus occultus* (Lebour, 1936), *Hippolyte varians* Leach, 1814 and *Thor amboinensis* (de Man, 1888). FRANSEN (1991) recorded *Lysmata olavo* from the Selvagens Islands. *Hippolyte prideuxiana* Leach, 1817 and *Lysmata seticaudata* (Risso, 1816) were recorded by WIRTZ (1994) and WIRTZ (1997), respectively; *Hippolyte leptocerus* (Heller, 1863) by D'UDEKEM D'ACÓZ (1996), and *Eualus lebourae* Holthuis, 1951 by FRANSEN & WIRTZ (1997).

L. ensiferus occurs in the Eastern Atlantic from Morocco to Senegal, the Azores, Canary Islands and Cape Verde Islands. It is also present in the Western Mediterranean and Western Atlantic (Bahamas, Guadalupe and Martinique) (D'UDEKEM D'ACÓZ, 1999). Although it has been present in the MMF collection since 1957, it is here recorded for the first time from the Archipelago of Madeira.

Family Pandalidae Haworth, 1825

Plesionika alexandri (A. Milne-Edwards, 1883)

Material examined: MMF 036233 (Fig. 1D), 1 ovigerous

female, 12.15 mm CL, Unicorn Seamount, 34° 32.3' N, 14° 41.56' W, ca. 2000 m, bottom trap, leg 2, RECPROFMAD-1 cruise, 26.10.2004.

Remarks: The family Pandalidae is represented by twelve species in Madeiran waters. *Stylopandalus richardi* (Coutière, 1905) was originally described from Madeira. *Heterocarpus ensifer* A. Milne-Edwards, 1881 and *Heterocarpus laevigatus* Spence Bate, 1888 were recorded by FIGUEIRA (1957), *Plesionika heterocarpus* (A. Costa, 1871) by CROSNIER & FOREST (1973), *Plesionika narval* (Fabricius, 1787) by CHAN & CROSNIER (1991), and *Heterocarpus grimaldii* A. Milne-Edwards & Bouvier, 1900, *Plesionika edwardsii* (Brandt, 1851), *Plesionika ensis* (A. Milne-Edwards, 1881), *Plesionika gliolioli* (Senna, 1902), *Plesionika martia* (A. Milne-Edwards, 1883) and *Plesionika williamsi* Forest, 1964 by BISCOITO (1993).

P. alexandri was previously recorded from the Gulf of Mexico, the Azores and off West Africa, South of Gibraltar (CHACE, 1989; GARCÍA RASO, 1996; FRANSEN & BISCOITO, 2006). This amphi-Atlantic species is here recorded for the first time from the Archipelago of Madeira.

Family Epialtidae MacLeay, 1838

Pisa armata (Latreille, 1803)

Material examined: MMF 023559, 1 male, 13.08 mm CL, 7.23 mm CW, Madeira Island, no additional data, 01.01.1893 (badly preserved specimen).

Pisa tetraodon (Pennant, 1777)

Material examined: MMF 023458, 1 non-ovigerous female, 28.83 mm CL, 16.93 mm CW, Madeira Island, Funchal Bay, 32° 38.74' N 16° 53.10' W, ca. 4 m, bottom trap, 18.11.1964; MMF 023312 (Fig. 1E), 1 male, 34.53 mm CL, 28.65 mm CW, Madeira Island, Baía d'Abra, 32° 44.76' N 16° 41.71' W, in a fishing net at 2-3 m of depth, stony bottom with sand, 22.07.1979.

Rochinia carpenteri (C. W. Thomson, 1873)

Material examined: MMF 025364, 1 non-ovigerous female, 23.50 mm CL, 17.54 mm CW, Madeira Island, Funchal Bay, 32° 37.80' N, 16° 54.10' W, ca. 100 m, bottom trap, 23.01.1992; MMF 036536, 1 non-ovigerous female, 33.89 mm CL, 27.48 mm CW, Madeira Island, Cabo Girão, 32° 36.791' N, 17° 04.202' W, ca. 750 m, bottom trap, stn. 33, CHACMAD-1 cruise, R/V Arquipélago, 21.10.2005; MMF 036585 (Fig. 1F), 1 male, 35.50 mm CL, 28.03 mm CW, Madeira Island, Cabo Girão, 32° 36.791' N 17° 04.202' W, ca. 750 m, bottom trap, stn. 33, CHACMAD-1 cruise, R/V Arquipélago, 21.10.2005; MMF 036645, 1 male, 27.79 mm

CL, 21.34 mm CW, Madeira Island, Cabo Girão, 32° 36.791' N 17° 04.202' W, ca. 750 m, bottom trap, stn. 33, CHACMAD-1 cruise, R/V Arquipélago, 21.10.2005.

Remarks: The family Epialtidae is represented in the Archipelago of Madeira by nine species: *Acanthonyx brevifrons* A. Milne-Edwards, 1869 recorded by A. MILNE-EDWARDS & BOUVIER (1900), *Acanthonyx lunulatus* (Risso, 1816) by LEDOYER (1967), *Anamathia rissoana* (Roux, 1828) (as *Rochinia rissoana*) and *Pisa nodipes* (Leach, 1815) by ZARIQUIEY ÁLVAREZ (1968), *Herbstia condyliata* (Fabricius, 1787) by MANNING & HOLTHUIS (1981), and *Pisa carinimana* Miers, 1879 by RAMALHOSA *et al.* (2014).

Pisa armata, *P. tetraodon* and *Rochinia carpenteri* are here recorded for the first time from Madeira. All three species occur only in the Eastern Atlantic and Mediterranean: *Pisa armata* from SW of British Isles to Angola, including the Azores, Canary Islands and Cape Verde Islands; *P. tetraodon* from SW of British Isles to Mauritania and Canary Islands; *Rochinia carpenteri* from South Iceland to Mauritania, Azores and Canary Islands (D'UDEKEM D'ACÓZ, 1999).

Family Inachidae MacLeay, 1838

Inachus leptochirus Leach, 1817

Material examined: MMF 025354 (Fig. 1G), 1 non-ovigerous female, 15.92 mm CL, 13.74 mm CW, Madeira Island, Funchal Bay, 32° 37.40' N 16° 54.00' W, ca. 300 m, bottom trap, 23.06.1992.

Inachus thoracicus Roux, 1830

Material examined: MMF 023742, 1 male, 14.75 mm CL, 13.48 mm CW, Madeira Island, Funchal Bay, Ponta do Garajau, 32° 37.93' N 16° 51.58' W, ca. 90 m, bottom trap, 28.03.1985; MMF 025353 (Fig. 1H), 1 male, 19.69 mm, 18.20 mm CW, Madeira Island, Funchal Bay, 32° 37.80' N 16° 54.10' W, ca. 100 m, bottom trap, 28.05.1992.

Remarks: Until now the family Inachidae was represented in Madeira by five species. *Ergasticus clouei* A. Milne-Edwards, 1882 and *Inachus aguiarii* de Brito Capello, 1876 were recorded by A. MILNE-EDWARDS & BOUVIER (1900), *Achaeus cranchii* Leach, 1817 by ZARIQUIEY ÁLVAREZ (1968), *Stenorhynchus lanceolatus* (Brullé, 1837) by MANNING & HOLTHUIS (1981) and *Inachus phalangium* (Fabricius, 1775) by FRANSEN & WIRTZ (1997).

Inachus leptochirus and *I. thoracicus* are here recorded for the first time from Madeira. Both species occur only in the Eastern Atlantic and Mediterranean: *I. leptochirus* from Färoe Islands to Mauritania and Azores; *I. thoracicus* from West of Portugal to Congo and Canary Islands (MANNING & HOLTHUIS, 1981; D'UDEKEM D'ACÓZ, 1999).

Family Majidae Samouelle, 1891

Eurynome spinosa Hailstone, 1835

Material examined: MMF 023561, 1 male, 6.17 mm CL, 4.38 mm CW, and 2 non-ovigerous females, 5.84-6.69 mm CL, 4.11-5.09 mm CW; MMF 023562 (Fig. 1I), 1 non-ovigerous female, 5.48 mm CL, 4.25 mm CW; MMF 023566, 1 non-ovigerous female, 6.51 mm CL, 4.72 mm CW, Madeira Island, ca. 70 m, 01.01.1889.

Remarks: *Eurynome spinosa* is the third species of the family Majidae recorded from the Archipelago of Madeira. A. MILNE-EDWARDS & BOUVIER (1900) recorded *Eurynome aspera* (Pennant, 1777), and WIRTZ (1995) recorded *Maja brachydactyla* Balss, 1922 (as *Maja squinado*).

E. spinosa occurs in the Eastern Atlantic, from South Norway to Morocco, the Mediterranean and Azores (D'UDEKEM D'ACÓZ, 1999), and it is here recorded for the first time from Madeira.

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Fig. 1 – **A)** Non-ovigerous female of *Kempfya corallina* (MMF 036162) recorded for the archipelago of Madeira (Unicorn Seamount). Escala = 10 mm; **B)** Non-ovigerous female of *Nematocarcinus gracilipes* (MMF 036653) recorded for Madeira Island. Escala = 10 mm; **C)** Non-ovigerous female of *Ligur ensiferus* from Porto Santo Island (MMF 036156). Escala = 10 mm; **D)** Ovigerous female of *Plesionika alexandri* from Unicorn Seamount (MMF 036233). Escala = 5 mm; **E)** Male of *Pisa tetraodon* from Madeira Island (MMF 023312). Escala = 10 mm; **F)** Male of *Rochinia carpenteri* from Madeira Island (MMF 036585). Escala = 10 mm; **G)** Non-ovigerous female of *Inachus leptochirus* from Madeira Island (MMF 025354). Escala = 10 mm; **H)** Male of *Inachus thoracicus* from Madeira Island (MMF 025353). Escala = 10 mm; and **I)** Non-ovigerous female of *Eurynome spinosa* from Madeira Island (MMF 023562). Escala = 5 mm.