

SPIXIANA	38	2	205–218	München, Dezember 2015	ISSN 0341-8391
----------	----	---	---------	------------------------	----------------

# The decapod crustaceans of Madeira Island – an annotated checklist

(Crustacea, Decapoda)

Ricardo Araújo & Peter Wirtz

Araújo, R. & Wirtz, P. 2015. The decapod crustaceans of Madeira Island – an annotated checklist (Crustacea, Decapoda). *Spixiana* 38(2): 205–218.

We list 215 species of decapod crustaceans from the Madeira archipelago, 14 of them being new records, namely *Hymenopenaeus chacei* Crosnier & Forest, 1969, *Styrodactylus serratus* A. Milne-Edwards, 1881, *Acanthephyra stylostratis* (Bate, 1888), *Alpheus holthuisi* Ribeiro, 1964, *Alpheus talismani* Coutière, 1898, *Galathea squamifera* Leach, 1814, *Trachycaris restrictus* (A. Milne Edwards, 1878), *Processa parva* Holthuis, 1951, *Processa robusta* Nouvel & Holthuis, 1957, *Anapagurus chiroacanthus* (Lilljeborg, 1856), *Anapagurus laevis* (Bell 1845), *Pagurus cuanensis* Bell, 1845, and *Heterocrypta* sp. Previous records of *Atyaephyra desmaresti* (Millet, 1831) and *Pontonia domestica* Gibbes, 1850 from Madeira are most likely mistaken.

Ricardo Araújo, Museu de História Natural do Funchal, Rua da Mouraria 31, 9004-546 Funchal, Madeira, Portugal; e-mail: ricardo.araujo@cm-funchal.pt

Peter Wirtz, Centro de Ciências do Mar, Universidade do Algarve, Campus de Gambelas, 8005-139 Faro, Portugal; e-mail: peterwirtz2004@yahoo.com

## Introduction

The first record of a decapod crustacean from Madeira Island was probably made by the English naturalist E. T. Bowdich (1825), who noted the presence of the hermit crab *Pagurus maculatus* (a synonym of *Paguristes eremita*). Later, Johnson (1867) described a new genus from the waters around Madeira Island and named it *Funchalia*, in honour of the island's capital Funchal.

d'Udekem d'Acoz (1999) listed the European decapods and in this compilation also very well covered the state of knowledge on the decapods of Madeira Island. In the year 2003, Araújo & Calado noted 171 decapod crustaceans from Madeira; however, this list also contains species recorded at the Selvagens, a group of islands politically belonging to Madeira jurisdiction but geographically closer to the Canary Islands and therefore not considered in the following (see Material and methods). Since then, several more decapod species have been recorded from Madeira Island, including the description of new species (e.g. Calado et al. 2004, Dos Santos et al. 2008). Rosa

et al. (2012) analysed the depth distribution of 175 decapod species at Madeira and the Selvagens, from the intertidal to abyssal depth. In the following, we summarize the state of knowledge in a checklist and note the presence of yet more species, previously not recorded from Madeira Island.

## Material and methods

Families are arranged in taxonomical order; species are arranged alphabetically within each family. We followed the classification presented in de Grave et al. (2009) and de Grave et al. (2014); for the family Sergestidae, we followed Vereshchaka et al. (2014). The area considered includes the island of Madeira, the neighbouring island of Porto Santo, and the small Desertas Islands off the south-eastern coast of Madeira. Records from the Selvagens Islands, which are closer to the Canary Islands than to Madeira Island, are not included here. Deep-sea and open water records are included with a radius of about 200 km around Madeira Island.

We have indicated by an asterisk (\*) when specimens from this area exist in the collection of the Museu

de História Natural do Funchal (previously Museu Municipal de História Natural, MMF). For each species, we also list the publication that (to our knowledge) gives the first record for this area. In some cases, we list a common synonym used in the literature.

### Checklist

#### Family Aristeidae Wood-Mason & Alcock, 1891

\* *Aristaeopsis edwardsiana* (Johnson, 1867)

First record for Madeira Island: Johnson (1867)

Remarks: Common synonym *Plesiopenaeus edwardsianus* (Johnson, 1868)

\* *Aristeomorpha foliacea* (Risso, 1827)

First record for Madeira Island: Stephensen (1923)

*Plesiopenaeus armatus* (Bate, 1881)

First record for Madeira Island: Fransen (1991)

#### Family Benthescymidae Wood-Mason & Alcock, 1891

*Bentheogenmema intermedia* (Bate, 1888)

First record for Madeira Island: Bouvier (1922)

*Gennades brevirostris* Bouvier, 1905

First record for Madeira Island: Judkins (2014)

*Gennades tinayrei* Bouvier, 1906

First record for Madeira Island: Judkins (2014)

*Gennadas valens* (S. I. Smith, 1884)

First record for Madeira Island: Bouvier (1908)

#### Family Penaeidae Rafinesque, 1815

\* *Funchalia danae* Burkenroad, 1940

First record for Madeira Island: Grippa (1987)

\* *Funchalia villosa* (Bouvier, 1905)

First record for Madeira Island: Grippa (1987)

\* *Funchalia woodwardsi* Johnson, 1867

First record for Madeira Island: Johnson (1867)

#### Family Solenoceridae Wood-Mason & Alcock, 1891

\* *Hymenopenaeus chacei* Crosnier & Forest, 1969

Remarks: First record for Madeira. Fransen (1991) recorded this species for the Selvagens Islands. In the meantime, M. Biscoito and R. Araújo captured several specimens of this species in the bay of Funchal, in 750 to 1000 m depth.

#### Family Sergestidae Dana, 1852

*Allosergestes nudus* Illig, 1914

First record for Madeira Island: Illig (1927)

*Allosergestes pectinatus* (Sund, 1920)

First record for Madeira Island: Hansen (1922)

\* *Allosergestes sargassi* Ortman, 1893

First record for Madeira Island: Hansen (1922)

*Deosergestes corniculum* (Krøyer, 1855)

First record for Madeira Island: Judkins (2014)

Remarks: Common synonym *Sergestes curvatus* Crosnier & Forest, 1973. The collection of the Zoologische Staatssammlung in Munich, Germany, contains a specimen (registration number ZSM A20021850), identified by L. Tiefenbacher, collected during FS Meteor cruise 9c/6 in July 1967 at Station 12 (32°25.00' N, 18°06.00' W) in a haul from 0 to 400 m depth.

*Deosergestes henseni* (Ortman, 1893)

First record for Madeira Island: Judkins (2014)

Remarks: The collection of the Zoologische Staatssammlung in Munich, Germany, contains a specimen (registration number ZSM A20021971), identified by L. Tiefenbacher, collected during FS Meteor cruise 9c/6 in July 1967 at Station 12 (32°25.00' N, 18°06.00' W) in a haul from 0 to 400 m depth.

*Eusergestes arcticus* (Krøyer, 1855)

First record for Madeira Island: Judkins (2014)

\* *Gardinerosergia splendens* (Sund, 1920)

First record for Madeira Island: Hansen (1922)

*Neosergestes edwardsii* Krøyer, 1855

First record for Madeira Island: Illig (1927)

\* *Parasergestes armatus* Krøyer, 1855

First record for Madeira Island: Hansen (1922)

*Parasergestes vigilax* (Stimpson, 1860)

First record for Madeira Island: Hansen (1922)

*Phorcosergia grandis* (Sund, 1920)

First record for Madeira Island: Judkins (2014)

*Phorcosergia wolffi* (Vereshchaka, 1994)

First record for Madeira Island: Judkins (2014)

*Robustosergia robusta* (S. I. Smith, 1882)

First record for Madeira Island: Hansen (1922)

\* *Sergestes arachnipodus* (Cocco, 1832)

First record for Madeira Island: Hansen (1922)

\* *Sergestes atlanticus* H. Milne Edwards, 1830

First record for Madeira Island: Hansen (1922)

*Sergia japonica* (Bate, 1881)

First record for Madeira Island: Hansen (1922)

*Sergia tenuiremis* (Krøyer, 1855)

First record for Madeira Island: Hansen (1922)

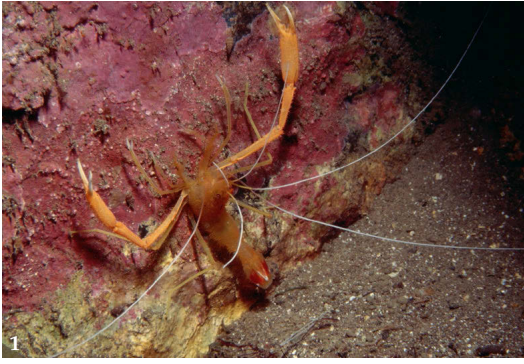


Fig. 1. *Stenopus spinosus* with white antennae, Caniço/Madeira (photo Peter Wirtz).

Fig. 2. *Stenopus spinosus* with red antennae, Caniço/Madeira (photo Peter Wirtz).

Fig. 3. *Trachycaris restrictus* from near Caniço/Madeira (photo Rui Costa).

Fig. 4. *Processa parva* from near Quinta do Lorde, Madeira (photo Peter Wirtz).

Fig. 5. *Processa robusta* with a bopyrid parasite in the right gill chamber, Reis Magos/Madeira (photo Peter Wirtz).

Fig. 6. *Pagurus cuanensis* at Caniçal/Madeira, carrying an undescribed species of *Epizoanthus* on its shell (photo Peter Wirtz).

### Family Stenopodidae Claus, 1827

\* *Stenopus spinosus* Risso, 1827

First record for Madeira Island: Lewinsohn & Holthuis (1978)

Remarks: *Stenopus spinosus* usually has conspicuously white antennae. d'Udekem d'Acoz & Wirtz (2002) noted that at the Azores the species can have

white or red or partially red-and-white antennae. The same is true for animals from Madeira (Figs 1, 2).

### Family Pasiphaeidae Dana, 1852

\* *Eupasiphae gilesi* (Wood-Mason, 1892)

First record for Madeira Island: Foxton (1970)



*Parapasiphae sulcatifrons* S. I. Smith, 1884

Remarks: Balss (1925) records a specimen from 1000 miles west of Madeira. The MMF collection contains a specimen with the imprecise location datum “west of Madeira”. We tentatively include this species in the Madeiran checklist.

\* *Pasiphaea hoplocerca* Chace, 1940

First record for Madeira Island: Figueira (1957)

\* *Pasiphaea multidentata* Esmark, 1866

First record for Madeira Island: Figueira (1957)

*Pasiphaea sivado* (Risso, 1816)

First record for Madeira Island: Judkins (2014)

\* *Psathyrocaris infirma* Alcock and A. R. S. Anderson, 1894

First record for Madeira Island: Araújo et al. (2013)

### Family Oplophoridae Dana, 1852

\* *Acanthephyra curtirostris* Wood-Mason & Alcock, 1891

First record for Madeira Island: Figueira (1957)

\* *Acanthephyra eximia* S. I. Smith, 1884

First record for Madeira Island: Figueira (1957)

*Acanthephyra microphthalmal* S. I. Smith, 1885

First record for Madeira Island: Fransen (1991)

\* *Acanthephyra pelagica* (Risso, 1816)

First record for Madeira Island: Figueira (1957)

\* *Acanthephyra purpurea* A. Milne-Edwards, 1881

First record for Madeira Island: Figueira (1957)

\* *Acanthephyra stylostratis* (Bate, 1888)

Remarks: Crosnier & Forest (1973) record a specimen from “between Gibraltar and Madeira”. The collection of the MMF contains a specimen with the location datum “perto da Madeira”, i.e. “close to Madeira”.

\* *Ephyrina figueirai* Crosnier & Forest, 1973

First record for Madeira Island: Figueira (1957)

*Heterogenys microphthalma* (S. I. Smith, 1885)

First record for Madeira Island: Fransen (1991)

\* *Kemphyra corallina* (A. Milne-Edwards, 1883)

First record for Madeira Island: Araújo et al. (2014)

*Meningodora mollis* S. I. Smith, 1882

First record for Madeira Island: Fransen (1991)

*Meningodora vesca* (Smith, 1886)

First record for Madeira Island: Judkins (2014)

\* *Notostomus elegans* A. Milne-Edwards, 1881

First record for Madeira Island: Figueira (1957)

\* *Oplophorus spinosus* (Brullé, 1839)

First record for Madeira Island: Figueira (1957)

\* *Systellaspis cristata* Faxon, 1893

First record for Madeira Island: Figueira (1957)

\* *Systellaspis debilis* (A. Milne-Edwards, 1881)

First record for Madeira Island: Figueira (1957)

### Family Atyidae de Haan, 1849

*Atyaephyra desmarestii desmarestii* (Millet, 1831)

Remarks: Holthuis (1950) is the only reference listing Madeira as a locality for this species. This has since been repeated many times, for instance by d’Udekem d’Acoz (1999) and by García Muñoz et al. (2009). However, Holthuis (1950) apparently did not have a specimen from Madeira and the species has not been found in numerous freshwater studies on Madeira (e.g. Stauder 1991, Hughes et al. 1998, Hughes 2003). This little freshwater shrimp is a most unlikely colonizer of Madeira Island and the Madeiran record for it is probably a mistake.

### Family Bresiliidae Calman, 1896

\* *Bresilia saldanhai* Calado, Chevaldonne & Dos Santos, 2004

First record for Madeira Island: Calado, Chevaldonne & Dos Santos (2004)

### Family Nematocarcinidae Smith, 1884

*Nematocarcinus gracilipes* Filhol, 1884

First record for Madeira Island: Araújo et al. (2014)

### Family Rhynchocinetidae Ortmann, 1890

\* *Cinetorhynchus rigens* (Gordon, 1936)

First record for Madeira Island: Tiefenbacher (1976)  
Remarks: Common synonym *Rhynchocinetes rigens* Gordon, 1936

### Family Stylodactylidae Bate, 1888

\* *Styloactylus serratus* A. Milne-Edwards, 1881

Remarks: First record for Madeira. The specimen in the collection of the MMF is from the stomach of a black scabbard fish (*Aphanopus carbo* Lowe, 1839) obtained at Funchal market.

### Family Gnathophyllidae Dana, 1852

\* *Gnathophyllum americanum* Guérin-Méneville, 1855  
First record for Madeira Island: Araújo (2002)

\* *Gnathophyllum elegans* (Risso, 1816)

First record for Madeira Island: Wirtz (1997)

### Family Palaemonidae Rafinesque, 1815

\* *Balssia gastii* (Balss, 1921)

First record for Madeira Island: Wirtz (1998)

- \* *Brachycarpus biunguiculatus* (Lucas, 1846)  
First record for Madeira Island: Wirtz (1997)
- \* *Palaemon elegans* Rathke, 1837  
First record for Madeira Island: Holthuis (1949)
- \* *Palaemon serratus* (Pennant, 1777)  
First record for Madeira Island: Biscoito (1985)
- Palaemon xiphias* Risso, 1816  
First record for Madeira Island: Fransen & Wirtz (1997)
- Palaemonella atlantica* Holthuis, 1951  
First record for Madeira Island: Wirtz (2006)  
Remarks: There is a specimen of this species in the collection of the MMF but its origin is unknown. A specimen from Madeira Island, collected by the second author, is in the Oxford University Natural History Museum under the number OUMNH.ZC.2006-17-001.
- \* *Periclimenaeus aurae* Dos Santos, Calado & Araújo 2008  
First record for Madeira Island: Dos Santos et al. (2008)
- \* *Periclimenes sagittifer* (Norman, 1861)  
First record for Madeira Island: d'Udekem d'Acoz & Wirtz (2002)  
Remarks: As noted by d'Udekem d'Acoz & Wirtz (2002) the Madeiran records of *Periclimenes* aff. *scriptus* by Wirtz (1996) and d'Udekem d'Acoz (1996b, 1999) are erroneous and actually refer to *Periclimenes sagittifer* (Norman, 1861). A colour photo of *P. sagittifer* taken at Madeira Island and correctly identified (but without indication of the locality) is given in Wirtz (1995, p. 105). The only Atlantic record of the mainly Mediterranean species *Periclimenes scriptus* (Risso, 1822) is from the coast of southern Portugal (d'Udekem d'Acoz 2005). Madeiran *P. sagittifer* differ from mainland Europe: they are smaller and less conspicuously coloured (d'Udekem d'Acoz & Wirtz 2002). At Madeira, *Periclimenes sagittifer* is usually associated with *Anemonia sulcata* (cf. photo in Wirtz 1995, p. 105). Recently, the second author has also, frequently, recorded this shrimp from the sea pen *Veretillum cynomorium* (Pallas, 1766). This is a new host record for *P. sagittifer*.
- \* *Periclimenes wirtzi* d'Udekem d'Acoz, 1996  
First record for Madeira Island: d'Udekem d'Acoz (1996b)
- Pontonia domestica* Gibbes, 1850  
First record for Madeira Island: Borradaile (1917)  
Remarks: Borradaile (1917) recorded this species from inside a *Pecten* at Porto Santo Island. The presence of this western Atlantic species at Porto Santo

Island appears doubtful; the specimen unfortunately can no longer be encountered in the collection of the British Museum of Natural History (Fransen 2002).

- \* *Pontonia pinnophylax* (Otto, 1821)  
First record for Madeira Island: Figueira (1960)
- \* *Tuleariocaris neglecta* Chace, 1969  
First record for Madeira Island: Wirtz et al. (1988)

#### Family Alpheidae Rafinesque, 1815

- \* *Alpheus dentipes* Guérin-Méneville, 1832  
First record for Madeira Island: Ledoyer (1967)
- \* *Alpheus holthuisi* Ribeiro, 1964  
Remarks: First record for Madeira. The collection of the MMF contains a specimen captured by the second author at Reis Magos in 30 m depth.
- \* *Alpheus macrocheles* (Hailstone, 1835)  
First record for Madeira Island: Wirtz in Debelius (1999)
- Alpheus platydactylus* Coutière, 1897  
First record for Madeira Island: Crosnier & Forest (1973)
- Alpheus talismani* Coutière, 1898  
Remarks: First record for Madeira. The collection of the Zoologische Staatssammlung in Munich, Germany, contains a specimen (registration number ZSM A20020633, identified by L. Tiefenbacher) collected "near Caniço" in 15 m depth by the second author in January 1997.
- \* *Athanas nitescens* forma *nitescens* (Leach, 1814)  
First record for Madeira Island: Ledoyer (1967)

#### Family Hippolytidae Bate, 1888

- \* *Hippolyte leptocerus* (Heller, 1863)  
First record for Madeira Island: d'Udekem d'Acoz (1996a)
- \* *Hippolyte prideauxiana* Leach, 1815  
First record for Madeira Island: Wirtz (1994)  
Remarks: Common synonym *Hippolyte huntii* Gosse, 1877
- \* *Hippolyte varians* Leach, 1814  
First record for Madeira Island: Ledoyer (1967)
- \* *Trachycaris restrictus* (A. Milne Edwards, 1878)  
Remarks: First record for Madeira Island. Detected by Pedro Vasconcelos near Caniço de Baixo in 18 m depth on rock covered with algae, in June 2011, and photographed during the same dive by Rui Costa (Fig. 3).

### Family Thoridae Kingsley, 1879

*Eualus lebourae* Holthuis, 1951

First record for Madeira Island: Fransen & Wirtz (1997)

\* *Eualus occultus* (Lebour, 1936)

First record for Madeira Island: Ledoyer (1967)

\* *Thor amboinensis* (de Man, 1888)

First record for Madeira Island: Wirtz (1997)

### Family Lysmatidae Dana, 1852

\* *Ligur ensiferus* (Risso, 1816)

First record for Madeira Island: Araújo et al. (2014)

\* *Lysmata grabhami* (Gordon, 1935)

First record for Madeira Island: Gordon (1935)

\* *Lysmata seticaudata* (Risso, 1816)

First record for Madeira Island: Wirtz (1997)

### Family Processidae Ortmann, 1896

\* *Processa macrophthalmia* Nouvel & Holthuis, 1957

First record for Madeira Island: Wirtz (1994)

*Processa modica carolli* Williamson, 1979

First record for Madeira Island: Fransen & Wirtz (1997)

\* *Processa parva* Holthuis 1951

Remarks: First record for Madeira. This species is common, at night, on sandy bottom in 10 to at least 32 m depth, in front of Quinta do Lorde harbour (Fig. 4) and in front of the airport. When the second author deposited a specimen in the MMF, it turned out that there already was a specimen in the collection, caught in front of Funchal in August 1963.

\* *Processa robusta* Nouvel & Holthuis, 1957

Remarks: First record for Madeira. The second author photographed (Fig. 5) and collected a specimen with a bopyrid parasite in its right gill chamber in 12 m depth during a night dive at Reis Magos (now in the Oxford University Natural History Museum under the number OUMNH.ZC.2011-02-35); a second specimen, now in the MMF collection, was collected at the same place, in 16 m depth.

### Family Pandalidae Haworth, 1825

\* *Heterocarpus ensifer ensifer* A. Milne-Edwards, 1881  
First record for Madeira Island: Figueira (1957)

\* *Heterocarpus grimaldii* A. Milne-Edwards & Bouvier, 1900

First record for Madeira Island: Biscoito (1993)

\* *Heterocarpus laevigatus* Bate, 1888

First record for Madeira Island: Figueira (1957)

\* *Plesionika alexandri* (A. Milne-Edwards, 1883)

First record for Madeira Island: Araújo et al. (2014)

\* *Plesionika edwardsii* (Brandt, 1851)

First record for Madeira Island: Biscoito (1993)

\* *Plesionika ensis* (A. Milne-Edwards, 1881)

First record for Madeira Island: Biscoito (1993)

\* *Plesionika giglioli* (Senna, 1902)

First record for Madeira Island: Biscoito (1993)

*Plesionika heterocarpus* (A. Costa, 1871)

First record for Madeira Island: Crosnier & Forest (1973)

\* *Plesionika martia martia* A. Milne-Edwards, 1883

First record for Madeira Island: Biscoito (1993)

\* *Plesionika narval* (J. C. Fabricius, 1787)

First record for Madeira Island: Chan & Crosnier (1991)

\* *Plesionika williamsi* Forest, 1964

First record for Madeira Island: Biscoito (1993)

\* *Stylopandalus richardi* (Coutière, 1905)

First record for Madeira Island: Coutière (1905)

### Family Crangonidae Haworth, 1825

\* *Philocheras bispinosos* (Hailstone, 1835) forma *bispinosus* (Hailstone, 1835)

First record for Madeira Island: Fransen & Wirtz (1997)

\* *Philocheras sculptus* (Bell, 1847)

First record for Madeira Island: d'Udekem d'Acoz (1999)

\* *Philocheras trispinosus* (Hailstone in Hailstone & Westwood, 1835)

First record for Madeira Island: Ledoyer (1967)

Family Enoplometopidae de Saint Laurent, 1988

\* *Enoplometopus antillensis* (Lütken, 1865)

First record for Madeira Island: Manning & Camp (1989)

### Family Nephropidae Dana, 1852

*Nephropsis atlantica* Norman, 1882

First record for Madeira Island: Bouvier (1917)

### Family Callianassidae Dana 1852

\* *Calliapagurops charcoti* de Saint Laurent, 1973

First record for Madeira Island: Dworschak & Wirtz (2010)

### Family Palinuridae Latreille, 1802

- \* *Palinurus elephas* (J. C. Fabricius, 1787)  
First record for Madeira Island: Silva & Meneses (1965)

### Family Scyllaridae Latreille, 1825

- \* *Scyllarides latus* (Latreille, 1803)  
First record for Madeira Island: Bouvier (1917)
- \* *Scyllarus arctus* (Linnaeus, 1758)  
First record for Madeira Island: Rathbun (1900)
- \* *Scyllarus pygmaeus* (Bate, 1888)  
First record for Madeira Island: Bouvier (1917)

### Family Polychelidae Wood-Mason, 1875

- Pentacheles laevis* Bate 1878  
First record for Madeira Island: Bouvier (1905) under the synonym *Polycheles eryoniformis* Bouvier 1905.

*Polycheles* aff. *granulatus* Faxon, 1893  
First record for Madeira Island: Bouvier (1917)

\* *Polycheles typhlops typhlops* Heller, 1862  
First record for Madeira Island: Bouvier (1917)

\* *Stereomastis sculpta* (S. I. Smith, 1880)  
First record for Madeira Island: Bouvier (1917)

### Family Galatheidae Samouelle, 1819

*Galathea dispersa* Bate, 1859  
First record for Madeira Island: Milne-Edwards & Bouvier, 1900

*Galathea faiali* Nunes-Ruivo, 1961  
First record for Madeira Island: Türkay (in Debelius 1999, p. 70)  
Remarks: The text accompanying this photo is erroneous (the first record of the species is off Lisbon, not off Madeira) but the record for the photo from Madeira is correct: the animal came from a trap of a fisherman (Türkay, pers. com. to second author).

\* *Galathea intermedia intermedia* Lilljeborg, 1851  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Galathea squamifera* Leach, 1814  
Remarks: First record for Madeira Island. In shallow water, this is probably the most common *Galathea* species. The MMF collection contains numerous specimens of *G. squamifera* and the second author has several underwater photos of this species from Madeira. Surprisingly, its presence at Madeira appears to be unrecorded.

\* *Munida curvimana* A. Milne-Edwards & Bouvier, 1894  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Munida intermedia* A. Milne-Edwards & Bouvier, 1899  
First record for Madeira Island: Miyake & Baba (1970)

\* *Munida rugosa* (J. C. Fabricius, 1775)  
First record for Madeira Island: Rice & de Saint Laurent (1986)

*Munida subcaeca* Bouvier, 1922  
First record for Madeira Island: Bouvier (1922)

### Family Albuneidae Stimpson, 1858

\* *Albunea carabus* (Linnaeus, 1758)  
First record for Madeira Island: Rubió & Holthuis (1976)

### Family Lithodidae Samouelle, 1819

*Neolithodes grimaldii* A. Milne-Edwards & Bouvier, 1894  
First record for Madeira Island: Milne-Edwards & Bouvier (1894)

### Family Diogenidae Ortmann, 1892

\* *Calcinus tubularis* (Linnaeus, 1767)  
First record for Madeira Island: Ingle (1993)

*Calcinus* n. sp.  
First record for Madeira Island: Calado et al. (2006)  
Remarks: Calado et al. (2006) described the extended parental care of this species (juveniles hatch at an advanced stage and remain with the mother for some time). The formal description of the species is still outstanding.

\* *Clibanarius aequabilis* Dana, 1851  
First record for Madeira Island: Dana (1851)

\* *Dardanus arrosor* (Herbst, 1796)  
First record for Madeira Island: Balss (1921)

\* *Dardanus calidus* (Risso, 1827)  
First record for Madeira Island: Milne-Edwards & Bouvier (1899)

\* *Paguristes eremita* (Linnaeus, 1767)  
First record for Madeira Island: Bowdich (1825)

\* *Paguristes rubropictus* A. Milne-Edwards & Bouvier, 1892  
First record for Madeira Island: Bouvier (1922)

### Family Paguridae Latreille, 1802

\* *Anapagurus chiroacanthus* (Lilljeborg, 1856)

Remarks: First record for Madeira. Specimens from the bay of Funchal and from Santa Cruz in the collection of the MMF.

\* *Anapagurus laevis* (Bell 1845)

Remarks: First record for Madeira. A specimen from the bay of Funchal in the collection of the MMF.

*Catapaguroides microps* A. Milne-Edwards & Bouvier, 1892

First record for Madeira Island: Bouvier (1922)

\* *Cestopagurus timidus* (P. Roux, 1830)

First record for Madeira Island: Calado & Nogueira (2004)

*Nematopagurus longicornis* A. Milne-Edwards & Bouvier, 1892

First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Pagurus cuanensis* Bell, 1845

Remarks: First record for Madeira. This is a common species in shallow water and it comes as a surprise that it apparently has not been recorded before (Fig. 6).

*Pagurus excavatus* (Herbst, 1791)

First record for Madeira Island: Bowdich (1825)

\* *Pagurus forbesi* Bell, 1845

First record for Madeira Island: Bouvier (1922)

\* *Pagurus prideaux* Leach, 1815

First record for Madeira Island: Milne-Edwards & Bouvier (1900)

### Family Parapaguridae S. I. Smith, 1882

*Paragiopagurus ruticheles* (A. Milne-Edwards, 1891)

First record for Madeira Island: Bouvier (1922)

### Family Dromiidae de Hann, 1833

\* *Dromia marmorea* Forest, 1974

First record for Madeira Island: Forest (1974)

### Family Homolidae de Haan, 1839

\* *Homola barbata* (J. C. Fabricius, 1793)

First record for Madeira Island: Zariquiey Alvarez (1968)

*Homologenus boucheti* Guinot & Richer de Forges, 1995

First record for Madeira Island: Bouvier (1922)

Remarks: *Homologenus rostratus* (A. Milne Edwards, 1880) is now considered the western Atlantic sister species and all eastern Atlantic records should be called *H. boucheti*.

\* *Paromola cuvieri* (Risso, 1816)

First record for Madeira Island: Milne-Edwards & Bouvier (1900)

### Family Calappidae de Haan, 1833

\* *Calappa granulata* (Linnaeus, 1758)

First record for Madeira Island: Türkay (1976)

\* *Cryptosoma cristatum* Brullé, 1837

First record for Madeira Island: Monod (1956)

### Family Cancridae Latreille, 1803

\* *Cancer bellianus* Johnson, 1861

First record for Madeira Island: Johnson (1861)

### Family Eriphiidae MacLeay, 1838

\* *Eriphia verrucosa* (Forskål, 1775)

First record for Madeira Island: Türkay (1976)

\* *Globopilumnus africanus* (A. Milne-Edwards, 1867)

First record for Madeira Island: Türkay (1976)

Remarks: The species called *Pilumnus villosissimus* in Wirtz (1995, p. 127 top) actually is *Globopilumnus africanus*; this photo was taken at Madeira Island.

### Family Goneplacidae MacLeay, 1814

\* *Goneplax rhomboides* (Linnaeus, 1758)

First record for Madeira Island: Türkay (1976)

### Family Progeryonidae Stevcic, 2005

\* *Paragalene longicrura* (Nardo, 1868)

First record for Madeira Island: Türkay (1976)

### Family Leucosiidae Samouelle, 1819

\* *Ebalia deshayesi* Lucas, 1846

First record for Madeira Island: Zariquiey Alvarez (1968)

\* *Ebalia edwardsii* O. G. Costa, 1838

First record for Madeira Island: Noel 1992

*Ebalia fragifera* Miers, 1881

First record for Madeira Island: Miers (1881)

\* *Ebalia tuberosa* (Pennant, 1777)

First record for Madeira Island: Türkay (1976)

### Family Epialtidae MacLeay, 1838

*Acanthonyx brevifrons* A. Milne-Edwards, 1869

First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Acanthonyx lunulatus* (Risso, 1816)

First record for Madeira Island: Ledoyer (1967)



\* *Anamathia rissoana* (P. Roux, 1828)  
First record for Madeira Island: Zariquiey Alvarez (1968) as *Rochinia rissoana*

\* *Herbstia condyliata* (J. C. Fabricius, 1787)  
First record for Madeira Island: Manning & Holthuis (1981)

\* *Pisa armata* (Latreille, 1803)  
First record for Madeira Island: Araújo et al. (2014)

\* *Pisa carinimana* Miers, 1879  
First record for Madeira Island: Ramalhosa et al. (2014)

\* *Pisa nodipes* (Leach, 1815)  
First record for Madeira Island: Zariquiey Alvarez (1968)

\* *Pisa tetradon* (Pennant, 1777)  
First record for Madeira Island: Araújo et al. (2014)

\* *Rochinia carpenteri* (Thomson, 1873)  
First record for Madeira Island: Araújo et al. (2014)

#### **Family Inachidae MacLeay, 1838**

\* *Achaeus cranchii* Leach, 1817  
First record for Madeira Island: Zariquiey Alvarez (1968)

\* *Ergasticus clouei* A. Milne-Edwards, 1882  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)  
Remarks: According to Marco-Herrero et al. (2013), the genus *Ergasticus* should probably be removed to the family Oregoniidae.

\* *Inachus aguiarii* de Brito Capello, 1876  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

*Inachus leptochirus* Leach, 1817  
First record for Madeira Island: Araújo et al. (2014)

\* *Inachus phalangiium* (J. C. Fabricius, 1775)  
First record for Madeira Island: Fransen & Wirtz (1997)  
Remarks: d'Udekem d'Acoz wrote (pers. comm. of 1 Sept 2005 to P. Wirtz) "I observed 4 years ago that there were slight but significant differences between the '*I. phalangiium*' from (1) Madeira and the Azores and (2) the NE Atlantic and the Mediterranean. ... It is not ruled out that the Madeiran/Azorean populations belong to a separate species."

\* *Inachus thoracicus* Roux, 1830  
First record for Madeira Island: Araújo et al. (2014)

\* *Macropodia deflexa* Forest, 1978  
First record for Madeira Island: Araújo & Biscoito (2015)

\* *Macropodia parva* van Noort & Adema, 1985  
First record for Madeira Island: Araújo & Biscoito (2015)

\* *Macropodia rostrata* (Linnaeus, 1761)  
First record for Madeira Island: Araújo & Biscoito (2015)

\* *Macropodia spinulosa* (Miers, 1881)  
First record for Madeira Island: Araújo & Biscoito (2015)

\* *Stenorhynchus lanceolatus* (Brullé, 1837)  
First record for Madeira Island: Manning & Houl-tuis (1981)

#### **Family Majidae Samouelle, 1819**

*Eurynome aspera* (Pennant, 1777)  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Eurynome spinosa* Hailstone, 1835  
First record for Madeira Island: Araújo et al. (2014)

\* *Maja brachydactyla* Balss, 1922  
First record for Madeira Island: Wirtz (1995) as *Maja squinado* (Herbst, 1788)

#### **Family Palicidae Bouvier, 1898**

\* *Palicus caronii* (P. Roux, 1830)  
First record for Madeira Island: Zariquiey Alvarez (1968)

#### **Family Parthenopidae MacLeay, 1838**

\* *Heterocrypta* sp.  
Remarks: First record of the genus for Madeira Island. The determination of the species is still outstanding.

\* *Parthenopoides massena* (P. Roux, 1830)  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Velolambrus expansus* (Miers, 1879)  
First record for Madeira Island: Miers (1879)

#### **Family Pilumnidae Samouelle, 1819**

\* *Pilumnus inermis* A. Milne-Edwards & Bouvier, 1894  
First record for Madeira Island: Monod (1956)

\* *Pilumnus spinifer* H. Milne-Edwards, 1834  
First record for Madeira Island: Türkay (1976)  
Remarks: Common synonym *Pilumnus hirtellus* (Linnaeus, 1761)

*Pilumnus villosissimus* (Rafinesque, 1814)  
First record for Madeira Island: Fransen (1991)

Remarks: The species called *Pilumnus villosissimus* in Wirtz (1995, p. 127 top) actually is *Globopilumnus africanus* (A. Milne-Edwards, 1867).

#### Family Geryonidae Colosi, 1923

\* *Chaceon affinis* (A. Milne-Edwards & Bouvier, 1894)  
First record for Madeira Island: Türkay (1976)

\* *Chaceon inglei* Manning & Holthuis, 1989  
First record for Madeira Island: Araújo et al. (2009)

#### Family Pirimelidae Alcock, 1899

\* *Pirimela denticulata* (Montagu, 1808)  
First record for Madeira Island: Ledoyer (1967)

#### Family Portunidae Rafinesque, 1815

\* *Bathynectes longipes* (Risso, 1816)  
First record for Madeira Island: Türkay (1976)

\* *Bathynectes maravinga* (Prestandrea, 1839)  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Polybius (Necora) corrugatus* A. Milne-Edwards, 1861  
First record for Madeira Island: Türkay (1976)

\* *Polybius (Polybius) marmoreus* (Leach, 1814)  
First record for Madeira Island: Türkay (1976)

\* *Laleonectes vocans* (A. Milne-Edwards, 1878)  
First record for Madeira Island: Türkay (1976)  
Remarks: Common synonym *Portunus vocans* (A. Milne-Edwards, 1878)

\* *Portunus hastatus* (Linnaeus, 1767)  
First record for Madeira Island: Türkay (1976)

\* *Portunus inaequalis* (Miers, 1881)  
First record for Madeira Island: Türkay (1976)

#### Family Pseudoziidae Alcock, 1898

\* *Euryzozius bouvieri* (A. Milne-Edwards, 1869)  
First record for Madeira Island: Monod (1956)

#### Family Xanthidae MacLeay, 1838

\* *Microcassiope minor* (Dana, 1852)  
First record for Madeira Island: Türkay (1976)

*Monodaesus rouxi* (Capart, 1951)  
First record for Madeira Island: Fransén (1991)

\* *Nanocassiope melanodactyla* (A. Milne-Edwards, 1867)  
First record for Madeira Island: Monod (1956)

\* *Paractea monodi* Guinot, 1969  
First record for Madeira Island: Türkay (1976)

\* *Platypodiella picta* Guinot, 1967  
First record for Madeira Island: Araújo & Freitas (2003)

\* *Xantho hydrophilus* (Herbst, 1790)  
First record for Madeira Island: Türkay (1976)  
Remarks: Common synonym *Xantho incisus* Leach, 1814.

*Xantho pilipes* A. Milne-Edwards, 1867  
First record for Madeira Island: Fransén (1991)

*Xantho* sp.  
First record for Madeira Island: Fransén (1991)  
Remarks: Fransén (1991) notes the presence of this species (which apparently does not correspond to any described *Xantho* species) from numerous places between the Azores and the Cape Verde Islands, including Madeira. The specimens are still unidentified (pers. comm. of C. H. J. M. Fransén to the second author on 19 April 2011).

#### Family Grapsidae MacLeay, 1838

\* *Grapsus adscensionis* (Ozbeck, 1765)  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

Remarks: Common synonym *Grapsus grapsus* (Linnaeus, 1758).

\* *Pachygrapsus marmoratus* (J. C. Fabricius, 1787)  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

\* *Pachygrapsus maurus* (Lucas, 1846)  
First record for Madeira Island: Rathbun (1918)

\* *Pachygrapsus transversus* (Gibbes, 1850)  
First record for Madeira Island: Lenz & Strunck (1914)

\* *Planes minutus* (Linnaeus, 1758)  
First record for Madeira Island: Chace (1951)

#### Family Plagusidae Dana 1851

\* *Euchirograpsus liguricus* H. Milne-Edwards, 1853  
First record for Madeira Island: Türkay (1975)

\* *Percnon gibbesi* (H. Milne-Edwards, 1853)  
First record for Madeira Island: Manning & Holthuis (1981)

Remarks: The genus *Percnon* may have to be recognized as a separate family Percnidae (Schubart & Cuesta 2010).

\* *Plagusia depressa* (J. C. Fabricius, 1775)  
First record for Madeira Island: Milne-Edwards & Bouvier (1900)

## Discussion

We have listed 215 records of decapod crustaceans from Madeira, including 14 new records, and have pointed out that a further two old records are rather doubtful.

González Pérez (1995) lists 266 decapod species for the Canary Islands. Since then, about 20 additional species have been recorded (e.g. Fransen & Wirtz 1997, Quiles et al. 2001). Even though one would expect the Canary Islands to have higher species numbers than Madeira (because they are closer to the equator, are closer to the African continent, and have a much longer shore line), the current number for Madeira appears rather low in comparison. Numerous, more cryptic decapod species probably still await their discovery at Madeira.

There are a few apparently introduced species in Madeiran waters (Wirtz 1998, Wirtz & Canning-Clode 2009, Canning-Clode et al. 2013) but no decapods appear to be introduced. None of the decapod species listed is endemic to Madeira Island. In contrast to the situation for coastal fishes (Wirtz et al. 2008), there also appear to be no shared endemic species for the Canary Islands plus Madeira, nor any shared endemic species for the Canary Islands plus Madeira plus the Azores (i.e. the so-called “Macaronesian Islands”).

Rosa et al. (2012) showed that decapod species diversity around Madeira Island shows an exponential decline with depth. Within the first 1500 m, the number of benthic species sharply declines, while the number of pelagic species increases.

As pointed out by Wirtz (1998), the shallow water fauna of Madeira is a mixture of species from the temperate Mediterranean-Atlantic region, some species with boreal origin, and a strong component of tropical species. The decapods *Enoplometopus antillensis* and *Tulearicaris neglecta* are examples of tropical elements in the marine fauna that reach their northern limit at Madeira.

## Acknowledgements

For comments on parts of an early version of the manuscript we are grateful to Cedric d’Udekem d’Acoz and José Cuesta. Thanks to David Judkins for comments on pelagic shrimps. Pedro Vasconcelos detected *Trachycaris restrictus* and Rui Costa photographed it; thanks for their permission to include this information here. Sammy de Grave of the Oxford University Natural History Museum kindly allowed us to include his identifications of *Processa parva* and *Processa robusta*. Thanks also to Roland Melzer and Stefan Friedrich for providing data on specimens in the ZSM collection, identified by Ludwig Tiefenbacher.

## References

- Araújo, R. 2002. *Gnathophyllum americanum* Guérin-Méneville, 1855 (Crustacea, Decapoda, Gnathophyllidae) a new record from the archipelago of Madeira (NE Atlantic Ocean). *Bocagiana* 208: 1–4.
- & Biscoito, M. 2015. The genus *Macropodia* Leach, 1814 (Crustacea, Decapoda, Inachidae) in the collection of the Funchal Natural History Museum. A new record from Madeira (Northeastern Atlantic Ocean). *Bocagiana* 241: 1–6.
- & Calado, R. 2003. *Crustáceos decápodes do Arquipélago da Madeira*. 236 pp., Funchal (Direcção Regional do Ambiente).
- & Freitas, M. 2003. A new crab record *Platyodiella picta* (A. Milne-Edwards, 1869) (Crustacea: Decapoda: Xanthidae) from Madeira Island waters. *Bocagiana* 212: 1–6.
- , Biscoito, M. & González, J. A. 2013. First record of *Psathyrocaris infirma* (Pasiphaeidae) from the Madeira and Canary Islands (Northeastern Atlantic). *Bocagiana* 237: 1–4.
- , Biscoito, M. & González, J. A. 2014. New records of decapod crustaceans from off the Archipelago of Madeira (north-eastern Atlantic). *Boletim do Museu de História Natural do Funchal* 64 (339): 45–56.
- , Biscoito, M., Santana, J. I. & González, J. A. 2009. First record of the deep-sea Red Crab *Chaceon inglei* (Decapoda: Geryonidae) from Madeira and the Canary Islands (Northeastern Atlantic Ocean). *Bocagiana* 230: 1–6.
- Balss, H. 1921. Crustacea VI: Decapoda Anomura (Paguridea) und Brachyura (Dromiacea bis Brachygnatha). Pp. 37–67 in: Michaelsen, W. (ed.). *Beiträge zur Kenntnis der Meeresfauna Westafrikas*, Band 3 (2).
- 1922. Crustacea VI: Decapoda Brachyura (Oxyrhyncha bis [und] Brachyrhyncha) und geographische Übersicht über Crustacea Decapoda. Pp. 69–110 in: Michaelsen, W. (ed.). *Beiträge zur Kenntnis der Meeresfauna Westafrikas*, Band 3 (3).
- 1925. *Macrura der Deutschen Tiefsee-Expedition*. 2. Natantia, Teil A. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer “Valdivia”, 1808–1810*, 20(5): 217–315 + pls 20–28.
- Biscoito, M. J. 1985. First Record of *Palaemon serratus* (Pennant, 1777) (Crustacea, Decapoda, Palaemonidae) in Madeira. *Bocagiana* 83: 1–2.
- 1993. An account on the shrimps of the family Pandalidae (Crustacea: Decapoda: Caridea) in Madeiran waters. *Courier Forschungsinstitut Senckenberg* 159: 321–325.
- Borradaile, L. A. 1917. The Percy Sladen Trust Expedition to the Indian Ocean in 1905, under the leadership of Mr. J. Stanley Gardiner, M. A. Volume 6, No. 8. On the Pontoniinae. *Transactions of the Linnean Society of London*, Ser. 2, 17(3): 323–396 + pl. 52–57.
- Bouvier, E. L. 1905. Sur les Crustacés décapodes (abstraction faite des Carides) recueillis par le yacht “Princesse Alice” au cours de la campagne de 1905. *Comptes Rendus (Hédomadaires) des Séances*

- de l'Académie des Sciences, Série D, Sciences Naturelles 141: 644–647.
- 1908. Crustacés décapodes (Pénéides) provenant des campagnes de l'Hirondelle et de la Princesse-Alice (1886-1907). Résultats des Campagnes Scientifiques accomplies par le Prince Albert I<sup>er</sup> de Monaco 33: 1-122 + pls 1-16.
- 1917. Crustacés décapodes (Macroures marcheurs) provenant des campagnes des yachts "Hirondelle" et "Princesse Alice" (1885-1915). Résultats des Campagnes Scientifiques accomplies par le Prince Albert I<sup>er</sup> de Monaco 50: 1-140 + pls 1-11.
- 1922. Observations complémentaires sur les crustacés décapodes (abstraction faite des Carides) provenant des campagnes de S.A.S. le Prince de Monaco. Résultats des Campagnes Scientifiques accomplies par le Prince Albert I<sup>er</sup> de Monaco 62: 1-106 + pls 1-6.
- Bowdich, E. T. 1825. Excursions in Madeira and Porto Santo. During the autumn of 1823, while on his third voyage to Africa. 278 pp., London (George B. Whittaker).
- Calado, R. & Nogueira, N. 2004. On the occurrence of *Cestopagurus timidus* (Roux, 1830) (Decapoda: Paguridae) in Madeira Island waters. Boletim do Museu de História Natural do Funchal 55(313): 17-23.
- , Chevaldonne, P. & Dos Santos, A. 2004. A new species of the deep-sea genus *Bresilia* (Crustacea: Decapoda: Bresiliidae) discovered from a shallow-water cave in Madeira. Journal of the Marine Biological Association of the United Kingdom 84: 191-199.
- , Nogueira, N. & Dos Santos, A. 2006. Extended parental care in a hermit crab of the genus *Calcinus* (Anomura: Diogenidae). Journal of the Marine Biological Association of the United Kingdom 86: 1-3.
- Canning-Clode, J., Fofonoff, P., McCann, L., Carlton, J. T. & Ruiz, G. 2013. Marine invasions on a subtropical island: fouling studies and new records in a recent marina on Madeira Island (eastern Atlantic Ocean). Aquatic Invasions 8: 261-270.
- Chace, F. A. Jr. 1951. The oceanic crabs of the genera *Planes* and *Pachygrapsus*. Proceedings of the United States National Museum 101: 65-101.
- Chan, T.-Y. & Crosnier, A. 1991. Crustacea Decapoda: Studies of the *Plesionika narval* (Fabricius, 1787) group (Pandalidae) with description of six new species. In: A. Crosnier (ed.). Résultats des Campagnes MUSORSTOM, Volume 9. Mémoires du Muséum National d'Histoire Naturelle, Série A, Zoologie, 152: 413-461.
- Coutière, H. 1905. Note préliminaire sur les Eucyphotes recueillis par S.A.S. le Prince de Monaco à l'aide du filet à grande ouverture (Campagnes de la "Princesse Alice" 1903-1904). Bulletin du Musée Océanographique de Monaco 48: 1-35.
- Crosnier, A. & Forest, J. 1973. Les crevettes profondes de l'Atlantique oriental tropical. 409 pp., Faune Tropicale 19, Paris (O.R.S.T.O.M.).
- Dana, J. D. 1851. Conspectus Crustaceorum quae in orbis terrarum circumnavigatione, Carolo Wilkes e classe Reipublicae Foederate Duce, lexit et descripsit. Proceedings of the Academy of Natural Sciences of Philadelphia 5: 267-272.
- De Grave, S., Li, C. P., Tsang, L. M., Chu, K. H. & Chan, T. Y. 2014. Unweaving hippolytoid systematics (Crustacea, Decapoda, Hippolytidae): resurrection of several families. Zoologica Scripta 43(5): 496-507.
- , Pentcheff, N. D., Ahyong, S. T., Chan, T. Y., Crandall, K. A., Dworschak, P. C., Felder, D. L., Feldmann, R. M., Fransen, C. H. J. M., Goulding, L. Y. D., Lemaitre, R., Low, M. E. Y., Martin, J. W., Ng, P. K. L., Schweitzer, C. E., Tan, S. H., Tshudy, D. & Wetzer, R. 2009. A classification of living and fossil genera of decapod crustaceans. Raffles Bulletin of Zoology, Supplement 21: 1-109.
- Debelius, H. 1999. Crustacea Guide of the world. 321 pp., Frankfurt.
- Dos Santos, A., Calado, R. & Araújo, R. 2008. First record of the genus *Periclimenaeus* Borradaile, 1815 (Decapoda: Palaemonidae: Pontoniidae) in the Northeastern Atlantic, with the description of a new species, *Periclimenaeus auae*. Journal of Crustacean Biology 28(1): 156-166.
- Dworschak, P. C. & Wirtz, P. 2010. Discovery of the rare burrowing shrimp *Callinapagurops charcoti* de Saint Laurent, 1973 (Decapoda: Axiidea: Callianassidae) in shallow water: first record of the infraorder for Madeira Island. Zootaxa 2691: 53-56.
- Figueira, A. J. G. 1957. Madeiran Decapod Crustaceans in the collections of the Museum Municipal do Funchal. I. On some interesting deep-sea prawns of the families Pasiphaeidae, Oplophoridae and Pandalidae. Boletim do Museu de História Natural do Funchal 10(26): 22-51 + pl. 1-4.
- 1960. On a small collection of decapod crustaceans from Azores. Bocagiana 6: 1-13.
- Forest, J. 1974. Les Dromies de l'Atlantique orientale. Description de *Sternodromia* gen. nov. et de deux espèces nouvelles du genre *Dromia* Weber (Crustacea Decapoda Dromidae). Annales de l'Institut Océanographique, Paris 50(1): 71-123.
- Foxton, P. 1970. The vertical distribution of pelagic decapods (Crustacea Natantia) collected by the SOND Cruise 1965. I. The Caridea. Journal of the Marine Biological Association of the United Kingdom 50: 939-960.
- Fransen, C. H. J. M. 1991. Crustacea of the CANCAP and MAURITANIA expeditions. 200 pp., Leiden (Nationaal Natuurhistorisch Museum).
- 2002. Taxonomy, phylogeny, historical biogeography, and historical ecology of the genus *Pontonia* (Crustacea: Decapoda: Caridea: Palaemonidae). Zoologische Verhandlungen 336: 1-433.
- & Wirtz, P. 1997. Contribution to the knowledge of decapod crustacean from Madeira and from the Canary Islands. Zoologische Mededelingen, Leiden 71(19): 215-230.
- García Muñoz, J. E., Rodríguez, A., García Raso, J. E. & Cuesta, J. A. 2009. Genetic evidence for cryptic speciation in the freshwater shrimp genus *Atyaephyra* de Brito Capello (Crustacea, Decapoda, Atyidae). Zootaxa 2025: 32-42.



- González Pérez, J. A. 1995. Catálogo de los Crustáceos decápodos de las Islas Canarias. 282 pp., Santa Cruz de Tenerife (Publicaciones Turquesa).
- Gordon, I. 1935. On new or imperfectly known species of Crustacea Macrura. *Journal of the Linnean Society, London, Zoology* 39: 307–351.
- Grippa, G. B. 1987. A revision of gen. *Pelagopenaeus* Burkenroad, 1934 and *Funchalia* Johnson, 1867 (Crustacea, Decapoda, Penaeidea). *Investigación Pesquera* 51 (supl. 1): 73–85.
- Hansen, H. J. 1922. Crustacés décapods (sergestides) provenant des campagnes des yachts “Hirondelle” et “Princesse Alice” (1885–1915). *Résultats des Campagnes Scientifiques accomplies par le Prince Albert 1<sup>er</sup> de Monaco* 64: 1–232 + pls 1–11.
- Holthuis, L. B. 1949. The Caridean Crustacea of the Canary Islands. *Zoologische Mededelingen, Leiden* 30(15): 227–225.
- 1950. Decapoda (K IX) A: Natantia. Macrura Reptantia en Stomatopoda (K X). Pp. 1–166 in: H. Boschma (ed.). *Fauna van Nederland* 15.
- Hughes, S. J. 2003. A study of the freshwater macroinvertebrate fauna of Madeira and its application in a regional ecological assessment system. Doctoral thesis, King’s College, University of London.
- , Furse, M. T., Blackburn, J. H. & Langton, P. 1998. A checklist of Madeiran freshwater macroinvertebrates. *Boletim do Museu Municipal do Funchal* 50(284): 5–41.
- Illig, G. 1927. Die Sergestiden der Deutschen Tiefsee-Expedition. *Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer “Valdivia”, 1898–1899*, 23: 279–354.
- Ingle, R. W. 1993. Hermit crabs of the Northeastern Atlantic Ocean and the Mediterranean Sea. An illustrated key. Pp. i–vi + 1–495, Chapman & Hall Identification Guide 4, London (Natural History Museum Publications).
- Johnson, J. Y. 1861. Description of a new species of *Cancer* obtained at Madeira. *Proceedings of the Zoological Society of London* (1861): 240–242.
- 1867. Description of a new genus and a new species of *Macrurus* Decapod Crustaceans, belonging to the Penaeidae, discovered at Madeira. *Proceedings of the Zoological Society of London* (1867): 895–901.
- Judkins, D. 2014. Geographical distribution of pelagic decapod shrimp in the Atlantic. *Zootaxa* 3895(3): 301–345.
- Ledoyer, M. 1967. Aperçu sur la faune vagile de quelques biotopes de l’archipel de Madère. Comparasion avec les biotopes méditerranéens homologues. *Arquivos do Museu Bocage, Sér. 2*, 1(19): 415–424 + 1 carte.
- Lenz, H. & Strunck, K. 1914. Die Dekapoden der Deutschen Südpolar-Expedition 1901–1903. I. Brachyuren und Macruren mit Ausschluss der Sergestiden. Pp. 257–345 + pl. 12–22 in: Von Drygalski, E. (ed.). *Deutsche Südpolar-Expedition 1901–1903*, Band 15, *Zoologie* 7. Berlin (Verlag Georg Reimer)
- Lewinsohn, C. & Holthuis, L. B. 1978. Notes on *Stenopus spinosus* Risso and *Engystenopus spinulatus* Holthuis (Crustacea, Decapoda, Stenopodidae). *Zoologische Mededelingen, Leiden* 53(20): 225–236.
- Manning, R. B & Camp, D. K. 1989. Additional records for an Atlantic reef lobster, *Enoplometopus antillensis* Lütken, 1865 (Crustacea, Decapoda, Enoplometopidae). *Proceedings of the Biological Society of Washington* 102(2): 411–417.
- & Holthuis, L. B. 1981. West African Brachyuran Crabs (Crustacea: Decapoda). *Smithsonian Contributions to Zoology* 306: i–xii + 1–379.
- Marco-Herrero, E., Torres, A. P., Cuesta, J. A., Guerao, G., Palero, F. & Abelló, P. 2013. The systematic position of *Ergasticus* (Decapoda, Brachyura) and allied genera, a molecular and morphological approach. *Zoologica Scripta* 42: 427–439.
- Miers, E. J. 1879. On the classification of the Maioid Crustacea or Oxyrhyncha, with a synopsis of the families, subfamilies, and genera. *Journal of the Linnean Society, Zoology, London*, 14: 634–673, pls 12–13.
- 1881. On a collection of crustacea made by Baron Hermann Malzman at Goree Island, Senegambia. *The Annals and Magazine of Natural History, Series* 5, 8: 204–220 + 259–281 + 364–377 + pl. 13–16.
- Milne-Edwards, A. & Bouvier, E.-L. 1894. Brachyures et Anomoures. In: Crustacés décapods provenant des campagnes du yacht l’Hirondelle (1886, 1887, 1888). Première partie. *Résultats des Campagnes Scientifiques, Albert 1<sup>er</sup> de Monaco*, 7: 1–112 + pls 1–11.
- & Bouvier, E.-L. 1899. Crustacés décapodes provenant des campagnes de l’Hirondelle (Supplément) et de la Princesse-Alice (1891–1897). *Résultats des Campagnes Scientifiques, Albert 1<sup>er</sup> de Monaco*, 13: 1–106 + pls 1–4.
- & Bouvier, E.-L. 1900. Brachyures et Anomoures. In: Crustacés Décapodes, Première partie. *Expéditions Scientifiques du Travailleur et Talisman pendant les Années 1880, 1881, 1882, 1883*, Paris, 1: 1–396 + pls 1–32.
- Miyake, S. & Baba, K. 1970. The Crustacea Galatheidæ from the tropical-subtropical region of West Africa, with a list of the known species. *Atlantide Report* 11: 61–97.
- Monod, T. 1956. Hippidea et Brachyura ouest-africains. *Mémoires de l’Institut Français d’Afrique Noire* 45: 1–674.
- Noel, P. Y. 1992. Cle préliminaire d’identification des Crustacea Decapoda de France et des principales autres espèces d’Europe. *Collection Patrimoines Naturels (Muséum National d’Histoire Naturelle, Paris)* 9: 1–145.
- Quiles, J. A., González, J. A. & Santana, J. I. 2001. Dendrobranchiata y Caridea nuevos o poco conocidos para las islas Canarias (Crustacea, Decapoda). *Boletín del Instituto Español de Oceanografía* 17: 7–13.
- Ramalhosa, P., Canning-Clode, J. & Bischoff, M. 2014. First record of *Pisa carinimana* (Decapoda: Epialtidae) from Madeira Island (Northeastern Atlantic Ocean). *Bocagiana* 239: 1–7.
- Rathbun, M. J. 1900. The decapod crustaceans of West Africa. *Proceedings of the United States National Museum* 22(1199): 271–316.

- 1918. The grapsoid crabs of America. Bulletin, Smithsonian Institution, United States National Museum 97: i-xxii + 1-161.
- Rice, A. L. & de Saint Laurent, M. 1986. The nomenclature and diagnostic characters of four north-eastern Atlantic species of the genus *Munida* Leach: *M. rugosa* (Fabricius), *M. tenuimana* G. O. Sars, *M. tenuimana* A. Milne-Edwards, *M. intermedia* A. Milne-Edwards and Bouvier, and *M. sarsi* Huus (Crustacea, Decapoda, Galatheidae). Journal of Natural History 20: 143-163.
- Rosa, R., Boavida-Portugal, J., Trübenbach, K., Baptista, M., Araujo, R. & Calado, R. 2012. Descending into the abyss: Bathymetric patterns of diversity in decapod crustaceans shift with taxonomic level and life strategies. Deep Sea Research I 64: 9-21.
- Rubió, M. & Holthuis, L. B. 1976. New records of *Albunea carabus* (L.) from Spanish waters (Decapoda, Anomura, Hippidae). Thalassia Jugoslavica 8(1): 41-47.
- Schubart, C. D. & Cuesta, J. A. 2010. Phylogenetic relationships of the Plagusidae Dana, 1851 (Brachyura), with the description of a new genus and recognition of Percnidae Števcic, 2005, as an independent family. Pp. 279-299 in: Castro, P., Davie, P. J. F., Ng, P. K. L. & Richer de Forges, B. (eds). Studies on Brachyura: a homage to Danièle Guinot. Crustaceana Monographs 11. Leiden (Brill).
- Silva, F. A. & Meneses, C. A. 1965. Elucidário Madeirense. 3ª ed., 3 vols. 1274 pp., Junta Geral do Distrito Autónomo do Funchal.
- Stauder, A. 1991. Water fauna of a Madeira stream with notes on the zoogeography of the Macaronesian islands. Boletim do Museu Municipal do Funchal 43(235): 243-299.
- Stephensen, K. 1923. Decapoda-Macrura excl. Sergestidae (Penaetidae, Pasiphaeidae, Hoplophoridae, Nematocarcinidae, Scyllaridae, Eryonidae, Nephropsidae, Appendix). Report on the Danish Oceanographical Expeditions 1908-10 to the Mediterranean and adjacent Seas 2(3): 1-85.
- Tiefenbacher, L. 1976. Einige Bemerkungen zu *Rhynchocinetes rigens* Gordon, 1936, und seiner Verbreitung (Decapoda). Crustaceana 31(3): 317-320.
- Türkay, M. 1975. Zur Kenntnis der Gattung *Euchirograpsus* mit Bemerkungen zu *Brachygrapsus* und *Litocheira* (Crustacea: Decapoda). Senckenbergiana Biologica 56(1/3): 103-132.
- 1976. Die Madeirensischen Brachyuren des Museu Municipal do Funchal und des Forschungs-Instituts Senckenberg. I. Familien: Dromidae, Homolidae, Calappidae, Leucosiidae, Cancridae, Portunidae, Xanthidae, Geryonidae, Gonoplacidae und Palicidae (Crustacea: Decapoda). Boletim do Museu Municipal do Funchal 30: 57-74.
- d'Udekem d'Acoz, C. 1996a. The genus *Hippolyte* Leach, 1814 (Crustacea: Decapoda: Caridea: Hippolytidae) in the East Atlantic Ocean and Mediterranean Sea, with a checklist of all species in the genus. Zoologische Verhandlungen, Leiden 303: 1-133.
- 1996b. Description of *Periclimenes wirtzi* sp. nov., a new pontoniine shrimp from Madeira and Azores with a checklist of Eastern Atlantic and Mediterranean Pontoniinae (Crustacea, Decapoda, Caridea). Bulletin de l'Institut Royal des Sciences Naturelles de Belgique, Biologie, 66: 133-149.
- 1999. Inventaire et distribution des crustacés décapodes de l'Atlantique nord-oriental, de la Méditerranée et des eaux continentales adjacentes au nord de 25°N. Collection Patrimoines Naturels (Muséum National d'Histoire Naturelle, Paris), 40: 1-383.
- 2005. Occurrence of *Periclimenes scriptus* (Risso, 1822) (Decapoda, Caridea, Pontoniinae) in Portuguese waters. Crustaceana 78(3): 367-370.
- & Wirtz, P. 2002. Observations on some interesting coastal Crustacea Decapoda from the Azores, with a key to the genus *Eualus* Thallwitz, 1892 in the Northeastern Atlantic and the Mediterranean. Arquipélago. Life and Marine Sciences 19A: 67-84.
- Vereshchaka, A., Olesen, J. & Lunina, A. 2014. Global diversity and phylogeny of pelagic shrimps of the former genera *Sergestes* and *Sergia* (Crustacea, Dendrobranchiata, Sergestidae), with definition of eight new genera. PLoS ONE 9(11): e112057. doi:10.1371/journal.pone.0112057
- Wirtz, P. 1994. Three shrimps, five nudibranchs, and two tunicates new for the marine fauna of Madeira. Boletim do Museu Municipal do Funchal 46(256): 167-172.
- 1995. Unterwasserführer Madeira Kanaren Azoren. Niedere Tiere. 247 pp., Bielefeld (Delius Klasing). [in German and English]
- 1996. Madeira und Azoren. Garnelen an Schwarzen Korallen. Die Aquarien- und Terrarienzeitschrift (DATZ) 49(7): 420-422.
- 1997. Crustacean symbionts of the sea anemone *Telmatactis cricoides* at Madeira and the Canary Islands. Journal of Zoology, London 242: 799-811.
- 1998. Twelve invertebrate and eight fish species new to the marine fauna of Madeira, and a discussion of the zoogeography of the area. Helgoländer Meeresuntersuchungen 52: 197-207.
- 2006. Ten invertebrates new for the marine fauna of Madeira. Arquipélago, Life and Marine Sciences 23A: 75-78.
- & Canning-Clode, J. 2009. The invasive bryozoan *Zoobotryon verticillatum* has arrived at Madeira Island. Aquatic Invasions 4(4): 669-670.
- , Fricke, R. & Biscoito, M. 2008. Coastal fishes of Madeira Island - new records and an annotated check-list. Zootaxa 1715: 1-26.
- , Müller, B. & Nahke, P. 1988. The Caribbean shrimp *Tuleariocaris neglecta* Chace found in association with *Diadema antillarum* at Madeira, and two new records of decapod crustaceans from Cape Verde Islands. Courier Forschungsinstitut Senckenberg 105: 169-171.
- Zariquiey Álvarez, R. A. 1968. Crustáceos decápodos Ibéricos. Investigación Pesquera 32: xv + 510.

# ZOBODAT - [www.zobodat.at](http://www.zobodat.at)

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Spixiana, Zeitschrift für Zoologie](#)

Jahr/Year: 2015

Band/Volume: [038](#)

Autor(en)/Author(s): Araujo Ricardo, Wirtz Peter

Artikel/Article: [The decapod crustaceans of Madeira Island - an annotated checklist 205-218](#)