

Peter Wirtz · Oscar Ocaña · Tina Molodtsova

## Actiniaria and Ceriantharia of the Azores (Cnidaria Anthozoa)

Received: 23 September 2002 / Revised: 11 March 2003 / Accepted: 14 March 2003 / Published online: 15 May 2003  
© Springer-Verlag and AWI 2003

**Abstract** The common shallow water species of sea anemones (Actiniaria) and tube anemones (Ceriantharia) of the Azores are listed. Eight species of sea anemones are mentioned, the species *Cereus pedunculatus* and *Sagartia affinis* being new records for the archipelago. Both species of Ceriantharia, namely *Arachnanthus nocturnus* and *Pachycerianthus solitarius*, are recorded from the Azores for the first time. *Arachnanthus nocturnus* is also recorded from the Cape Verde Islands and from Madeira for the first time.

**Keywords** Cape Verde Islands · Madeira · Sea anemones · Tube anemones · Zoogeography

### Introduction

During the last 10 years, the first author has made approximately 500 scuba dives in the Azores, off the islands of Faial (more than 400 dives), Pico (about 50 dives), São Miguel (about 30 dives), Terceira (10 dives), Flores (9 dives), Corvo (3 dives) and Santa Maria (3 dives). Many remarkable invertebrate species were photographed and collected on these occasions (Wirtz and Martins 1993; den Hartog et al. 1993; d'Udekem d'Acoz 1996, 2000; Wirtz and Vader 1997; Wirtz 1998, 1999,

2000). We here present a fauna list for the Actiniaria and Ceriantharia of the Azores, with some zoogeographical remarks. There are no publications dealing mainly with the Actiniaria of the Azores, except Riemann-Zürneck (1978) on deep-sea species. No Ceriantharia have been recorded previously from the Azores.

### Methods

Observations were gathered by the first author during scuba dives at a depth range of 0–60 m. Anemones were photographed in the field and collected for identification. They were anaesthetized in a MgCl<sub>2</sub> solution and preserved in formalin. Some of the specimens are now in the private collections of the second and third authors.

### Results

Anthozoa Actiniaria (Sea anemones)

*Actinia equina mediterranea* Schmidt, 1971

This green *Actinia* is occasionally seen at the water line, especially in sheltered places such as the inside of harbour walls. It was identified by the second author, by its species-typical nematocyst pattern. Specimens from Pico and Faial islands proved to be full of the ciliate *Foettingeria actinarium* (Claparède, 1863), clearly visible as balls in the tentacles.

A red *Actinia* can also occasionally be encountered in the intertidal zone in the Azores. This could be either a red form of *Actinia equina mediterranea* or could be *Actinia equina atlantica*, already recorded from the Azores (Schmidt 1971). The species needs to be studied in more detail.

*Aiptasia mutabilis* (Gravenhorst, 1831)

This is probably the most common sea anemone in a depth range of 0–20 m in the Azores. The species is

Communicated by H.-D. Franke

P. Wirtz (✉)  
Departamento de Oceanografia e Pescas,  
9901-862 Horta, Açores, Portugal  
e-mail: biomar@uma.pt

O. Ocaña  
Instituto Estudios Ceutíes (CECEL-CSIC),  
Paseo del Revellín 30, Apto. 593, 51080 Ceuta, Spain

T. Molodtsova  
Benthos Laboratory, P. Shirshov Institute of Oceanology,  
Nakhimovsky prospekt 36, 117218 Moscow, Russia

*Present address:*

P. Wirtz, Centro de Ciências do Mar do Algarve,  
Campus de Gambelas, 8000-810 Faro, Portugal

known from the eastern Atlantic, from Ireland to the Canary Islands, and from the Mediterranean Sea (Ocaña et al. 1994); Ocaña (1994) and Morton et al. (1998) mention its presence in the Azores.

*Alicia mirabilis* Johnson, 1861

This is a common species in the Azores. The species is known from the eastern Atlantic, from the Portuguese continental coast as far north as Cascais (P. Wirtz, unpublished observations) to the Canary Islands (Ocaña 1994), and from the western Mediterranean Sea (Rossi 1983; Ocaña et al. 2000). *Alicia mirabilis* is also known from the Western Atlantic, from Florida and the Bahamas to Brazil (Humann 1992; Zamponi et al. 1998); den Hartog (1995) and Morton et al. (1998) mention the presence of the species in the Azores.

*Anemonia melanaster* (Verrill, 1907)

This is a common species in the Azores; den Hartog (1995) has recorded it from the Azores. The species is also known from the western Atlantic, from Bermuda to Brazil, from *Sargassum* floating in mid-Atlantic (Coston-Clements et al. 1991), and in the eastern Atlantic from Madeira (Ocaña 1994), the Canary Islands (Ocaña 1994) and the coast of Senegal (P. Wirtz, unpublished observations) – sometimes under the synonym *Anemonia sargassensis* Hargitt, 1908. The species is missing from a recently published list of European Hexacorallia (van der Land 2001).

*Anthopleura ballii* (Cocks, 1851)

This is an uncommon species in the Azores. The species is known from Great Britain as far north as the Isle of Man to Equatorial Guinea and from the Mediterranean Sea (Hayward and Ryland 1995; Ocaña 1994). Ocaña (1994) mentions its presence in the Azores.

*Sagartia affinis* Johnson, 1861

This anemone can commonly be found attached to shells inhabited by the hermit crab *Dardanus calidus* (Risso, 1827). The species was known only from Madeira and the Canary Islands (Ocaña 1994) and is here recorded from the Azores for the first time. Morton et al. (1998) are probably referring to this species when they write about *Calliactis parasitica* (Couch, 1838) – a sea anemone commonly found on shells of hermit crabs in the eastern Atlantic and the Mediterranean. There are no confirmed records of *C. parasitica* from the Azores, while *Sagartia affinis* is a common species. *Sagartia affinis* is missing from a recently published list of European Hexacorallia (van der Land 2001).

*Cereus pedunculatus* (Pennant, 1777)

The live-bearing form of this species can occasionally be found in shallow water, typically in pools. The species is known from the eastern Atlantic, from Scotland to the Canary Islands, and from the Mediterranean Sea (Hayward and Ryland 1995; Ocaña 1994). Apparently it has not previously been recorded from the Azores.

*Telmatactis forskalii* (Ehrenberg, 1834)

This species can be seen projecting from cracks and crevices in rocky substrate, especially in dark places such as overhangs and cave entrances and also on the sandy bottom. The species is known from the eastern Atlantic, from the area of Biarritz in SW France to the Cape Verde Islands, as well as from the Mediterranean Sea (den Hartog 1995); den Hartog (1995) also mentions its presence in the Azores.

Anthozoa Ceriantharia (Tube anemones)

*Arachnanthus nocturnus* den Hartog, 1977

This species can occasionally be seen at night, projecting from cracks and crevices in rocky substrate. It has not previously been recorded from the Azores. The species is known from the Caribbean to Bermuda (den Hartog 1977; Cairns et al. 1986; Humann 1992) and in the eastern Atlantic from the Cape Verde Islands (P. Wirtz, unpublished; identifications from underwater photos confirmed by the late J.C. den Hartog) and from Madeira (photo in Wirtz 1998, specimens identified by the third author). There is a record of *A. nocturnus* from the Mediterranean coast of Spain, province of Granada (Ocaña Martín et al. 2000), where the species is considered abundant; however, the accompanying photo (page 118 top) does not show this species; its presence in the Mediterranean Sea thus remains doubtful.

*Pachycerianthus solitarius* (Rapp, 1829)

A small grey or light-brown cerianthid is common on sandy bottom in about 8 m depth inside Horta Harbour, Faial Island. This is *Pachycerianthus solitarius* (Rapp, 1829), a species common in the Mediterranean Sea and also recorded from the Black Sea (Kiseleva 1975). Fisher (1889) reported a single specimen of this species from the Atlantic coast of France, where it has never been recorded again. Upon dissection of the seven specimens from Horta Harbour, the third author noted that all of them showed irregularities in the arrangement of the tentacles and protomesenteries (as described by Carlgren (1912) for *P. solitarius* from the Mediterranean Sea), indicating their origin by asexual reproduction (see Discussion).

## Discussion

The species of sea anemones and tube anemones listed in this paper are the most common and most conspicuous. No doubt, further observation will reveal a number of additional species. den Hartog (1995) mentions the presence of the cosmopolitan species *Diadumene luciae* (Verrill, 1898) in the Azores. Morton et al. (1998) note the species *Bunodactis verrucosa* (Pennant, 1777) – recorded from Scotland to the Canary Islands and from the Mediterranean Sea (Ocaña 1994), and *Adamsia carciniopados* (Otto, 1823) – recorded from Norway to the Canary Islands and from the Mediterranean Sea (Ocaña 1994). Because no specimens or photos appear to exist for these three records, they have to be regarded as unconfirmed at present.

All ten identified shallow-water anthozoan species recorded from the Azores so far have an eastern Atlantic affinity. Not a single species is exclusively shared with the western Atlantic. This is in accordance with previous analyses of the zoogeography of the shallow-water fauna of the Azores (Gofas 1990; Wirtz and Martins 1993; Ávila 2000, and references therein).

The species *Alicia mirabilis*, *Anemonia melanaster* and *Arachnanthus nocturnus* also occur in the western Atlantic. At present, it is impossible to tell whether they have crossed the Atlantic from east to west or from west to east. They could have crossed the Atlantic in the Gulf Stream (which is particularly likely in the case of *Anemonia melanasters*, found on floating *Sargassum*) or via equatorial currents (see discussions in Boekschoten and Best 1988; Muss et al. 2001; Wirtz 2001).

The cerianthid *Pachycerianthus solitarius* so far has only been found inside Horta Harbour, Faial Island. This could indicate that it is a species accidentally introduced by boats – possibly in the form of larvae in ballast water, as it is not a fouling organism.

**Acknowledgements** This article was intended to be a joint publication with J.C. (“Koos”) den Hartog of the Nationaal Natuurhistorisch Museum at Leiden, Holland. He died in the year 2000. This paper could not have been written without his input. The first author is grateful to the director of the department, Dr. Ricardo Serrão Santos and the Fundação para a Ciência e Tecnologia for a grant to work at the Department of Oceanography and Fisheries, University of the Azores, as an invited scientist from 1999 to 2001 (Praxis XXI/BCC/16435/98).

## References

- Ávila SP (2000) Shallow water marine molluscs of the Azores: biogeographical relationships. Arquipélago (Bull Univ Azores Life Mar Sci) [suppl 2 part A]:99–132
- Boekschoten GJ, Best MB (1988) Fossil and recent shallow water corals from the Atlantic islands off western Africa. Zool Meded Leiden 62:99–112
- Cairns S, Hartog JC den, Arneson C, Rützler K (1986) Anthozoa. In: Sterrer W (ed) Marine fauna and flora of Bermuda. Wiley, New York
- Carlgrén O (1912) Über Ceriantharien des Mittelmeers. Mitt Zool Station Neapel 20(3):356–394
- Coston-Clements L, Settle LR, Hoss DE, Cross FA (1991) Utilization of the Sargassum habitat by marine invertebrates and vertebrates: a review. NOAA technical memorandum NMFS-SEFSC-7296
- d’Udekem d’Acoz C (1996) Description of *Periclimenes wirtzi* sp. nov., a new pontonine shrimp from Madeira and Azores, with a checklist of eastern Atlantic and Mediterranean Pontoninae (Crustacea, Decapoda, Caridea). Bull Inst R Sci Nat Belg Biol 66:133–149
- d’Udekem d’Acoz C (2000) Redescription of *Lysmata intermedia* (Kingsley, 1879) based on topotypical specimens, with remarks on *Lysmata seticaudata* (Risso, 1816) (Decapoda, Caridea, Hippolytidae). Crustaceana 73 (6): 719–735
- Fisher P (1889) Nouvelle contribution à l’actinologie française. 1. Actinies d’Arcachon (Gironde). Actes Soc Linn Bordeaux 43:252–309
- Gofas S (1990) The littoral Rissoidae and Anabathridae of São Miguel, Açores. Açoreana 1990 [suppl]:97–134
- Hartog JC den (1977) Descriptions of two new Ceriantharia from the Caribbean region with a discussion of the cnidom and of the classification of the Ceriantharia. Zool Meded Leiden 51(14):211–242
- Hartog JC den (1995) The genus *Telmatactis* Gravier, 1916 (Actiniaria: Acontinaria: Isophelliidae) in Greece and the eastern Mediterranean. Zool Meded Leiden 69(14):153–176
- Hartog JC den, Ocaña O, Brito A (1993) Corallimorpharia collected during the CANCAP expeditions (1976–1986) in the south-eastern part of the North Atlantic. Zool Verh Leiden 282:1–76
- Hayward PJ, Ryland JS (1995) Handbook of the marine fauna of north-west Europe. Oxford University Press, Oxford
- Humann P (1992) Reef creature identification: Florida Caribbean Bahamas. Jacksonville, Fla.
- Kiseleva MI (1975) Food spectra of some benthic invertebrates in the Black Sea. Zool Zh 54(11):1595–1600
- Land J van der (2001) Hexacorallia. In: Costello MJ, Emblow CS, White R (eds) European register of marine species: a check-list of the marine species in Europe and a bibliography of guides to their identification. (Patrimoines naturels 50) SPN / IEGB / MNHN, Paris, pp 106–109
- Morton B, Britton JC, Martins AMF (1998) Coastal ecology of the Azores. Sociedade Afonso Chaves, Ponta Delgada
- Muss A, Robertson R, Wirtz P, Bowen B, Stepien CA (2001) Phylogeography of the genus *Ophioblennius*: the role of ocean currents and geography in fish evolution. Evolution 55(3):561–572
- Ocaña A, Sánchez Tocino L, López-González PJ (2000) Consideraciones faunísticas y biogeográficas de los antozoos (Cnidaria: Anthozoa) de la costa de Granada (Mar de Alborán). Zool Baetica 11:51–65
- Ocaña O (1994) Actiniaria y Corallimorpharia de la Macaronesia Central: Canarias y Madeira. Doctoral thesis, Universidad de La Laguna
- Ocaña O, Núñez J, Bacallado JJ (1994) Descriptive study of *Aiptasia mutabilis* (Gravenhorst, 1831) (Anthozoa: Actiniaria) in the Canary Islands. Bol Mus Munic Funchal 46(255):145–157
- Ocaña Martín A, Sánchez Tocino L, López González S, Viciano Martín JF (2000) Guía submarina de invertebrados no artrópodos, 2nd edn. Albolote, Granada
- Riemann-Zürneck K (1978) Tiefsee-Aktinien der Familie Actinoscyphiidae aus dem Nordatlantik (Actiniaria, Mesomyaria). Zool Scr 7:145–153
- Rossi L (1983) Anthozoa. In: Riedl R (ed) Fauna und Flora des Mittelmeeres. Parey, Hamburg
- Schmidt H (1971) Taxonomie, Verbreitung und Variabilität von *Actinia equina* Linné 1766 (Actiniaria: Anthozoa). Z Zool Syst Evolutionsforsch 9:161–169
- Wirtz P (1998) Opisthobranch molluscs from the Azores. Vita Mar 45 (1–2):1–16
- Wirtz P (1999) Caprellid–holothurian associations at the Azores. Arquipélago (Bull Univ Azores Life Mar Sci) 16A:53–55

- Wirtz P (2000) *Hydatina physis* (Mollusca Gastropoda Opisthobranchia) at the Azores. Arquipélago (Bull Univ Azores Life Mar Sci) 17A:97–100
- Wirtz P (2001) New records of marine invertebrates from the Cape Verde Islands. Arquipélago (Bull Univ Azores Life Mar Sci) 18A:81–84
- Wirtz P, Martins HR (1993) New and little known marine invertebrates from the Azores with a discussion of the zoogeography of the area. Arquipélago (Bull Univ Azores Life Mar Sci) 11 A:55–63
- Wirtz P, Vader W (1997) A new caprellid–starfish association: *Caprella acanthifera* s.l. on *Ophidiaster ophidianus* and *Hacelia attenuata* from the Azores. Arquipélago (Bull Univ Azores Life Mar Sci) 14A:17–22
- Zamponi MO, Belem MJC, Schlenz E, Acuna H (1998) Distribution and some ecological aspects of Corallimorpharia and Actiniaria from shallow water of the south American Atlantic coasts. Physis Secc A 55(128–129):31–45