

New records of marine invertebrates from São Tomé Island (Gulf of Guinea)

Peter Wirtz

Centro de Ciências do Mar, Universidade do Algarve, Campus de Gambelas, P-8000-117 Faro, Portugal.
E-mail: biomar@dragoeiro.uma.pt

The anthozoan *Actinostella flosculifera*, the polychaete *Lygdamis wirtzi*, the decapods *Gnathophyllum americanum* and *Periclimenes platalea*, the phoronid *Phoronis australis*, the holothurian *Euapta lappa*, and the asteroid *Goniaster tessellatus* are recorded from São Tomé Island for the first time. The marine zoogeography of the area is briefly discussed, with special emphasis on the high proportion of amphi-Atlantic species.

INTRODUCTION

The marine biology of São Tomé Island, Gulf of Guinea (0°N 6°E), is largely unknown and only few species lists exist for that area (Gascoigne, 1996). During two trips to São Tomé, in January 1990 and in August 2002, I photographed and collected marine invertebrate species. Seven invertebrate species, from five different phyla, that have not previously been recorded from São Tomé are recorded here. Five of these seven species also occur in the tropical western Atlantic and the marine fauna of the islands in the Gulf of Guinea appears to have a large proportion of amphi-Atlantic species.

MATERIALS AND METHODS

The animals were observed, photographed *in situ*, and collected (*Lygdamis wirtzi*, *Gnathophyllum americanum* and *Periclimenes platalea*) during nine SCUBA dives (including one night dive) on the north coast of São Tomé and 15 SCUBA dives (including one night dive) on the south coast of São Tomé. Specimens were sent to experts for identification or validation of my identification (see Acknowledgements). *Lygdamis wirtzi* is now deposited in the collection of the Natural History Museum and Institute Chiba, Japan, collection no. CMNH-ZWO 1439. *Gnathophyllum americanum* and *P. platalea* are in the Nationaal Natuurhistorisch Museum, Leiden, The Netherlands, under the numbers RMNH 50049 and RMNH 50047.

RESULTS

Actinostella flosculifera (Lesueur, 1817) (Cnidaria: Anthozoa)

The unmistakable, warty-looking expanded disc of this sea anemone lies on the surface of sandy or rubble bottom. The species was seen in 17 m depth near Rolas Island, 2 km south of São Tomé Island, and in a large tide pool of Rolas Island. It has been recorded in the western Atlantic, from Bermuda to Mar de la Plata, and in the eastern Atlantic from the Canary Islands; it is also known from the eastern Pacific, from the Gulf of California to Panama (Ocaña, 1994).

Lygdamis wirtzi Nishi & Núñez, 2000 (Annelida: Polychaeta)

This sabellariid polychaete was encountered on a sandy slope in the Lagoa Azul, north-eastern coast of São Tomé, in a depth of about 10 m. The species was photographed and one animal was collected and sent to E. Nishi for validation of my provisional identification. The species has only recently been described from Madeira and from the Canary Islands, where it is common (Nishi & Núñez, 2000) and has also been recorded in the Cape Verde Islands (Wirtz, 2001).

Gnathophyllum americanum Guérin-Méneville, 1855
(Crustacea: Decapoda)

A single animal of this species was caught in a tide pool on Rolas Island. The species has been recorded from the tropical western Atlantic, and the eastern Atlantic from the Canary Islands (d'Udekem d'Acoz, 1999).

Periclimenes platalea Holthuis, 1951 (Crustacea: Decapoda)

Five specimens of this species were collected, in a depth of 14 m and 26 m, at Rolas Island, by wiping a small hand net over living Gorgonaria (genus *Leptogorgia*). *Peridomenes platalea* has been recorded from Guinea and from the Cape Verde Islands (Wirtz & d'Udekem d'Acoz, 2001). The animals of Wirtz & d'Udekem d'Acoz (2001) were also collected from anthozoans, namely *Leptogorgia gainii* and Antipatharia.

Phoronis australis Haswell, 1883 (Tentaculata: Lophophorata)

Unidentified black cerianthids (Anthozoa: Ceriantharia, genus *Pachycerianthus* or *Cerianthus*) were observed in about 5 to 10 m depth on a sandy slope in Lagoa Azul, north-west coast of São Tomé. Several of them were seen to bear phoronids in their tube walls and this association was documented by underwater photography. No specimens were collected. *Phoronis australis* is a circum(sub)tropical species; in the eastern Atlantic, it has been recorded from the Canary Islands and Senegal (Ocaña et al., 1991) and the Cape Verde Islands (Wirtz, 2001); the author has recently also encountered it on the Portuguese Atlantic coast (Wirtz, in press). Until now, no phoronid had been recorded from São Tomé Island (C. Emig, personal communication).

Euapta lappa (Müller, 1850) (Echinodermata: Holothuroidea)

During both night dives, on the south coast and the north coast of São Tomé, this sea cucumber was recorded as a common species, in a depth of about 15–20 m. It has been recorded in the western Atlantic from the Bahamas, Florida, and the Caribbean, and in the eastern Atlantic from the Canary and the Cape Verde Islands (Pérez-Ruzafa et al., 2000).

Goniaster tessellatus Clark & Downey, 1992 (Echinodermata: Asteroidea)

This brilliantly coloured and unmistakable starfish was encountered on a mud-flat in 20 m depth near the Ilha das Cabras, north-eastern coast of São Tomé. The species has been recorded in the western Atlantic from North Carolina and Bermuda to Brazil, and in the eastern Atlantic from Morocco to the Cape Verde Islands (Pérez-Ruzafa et al., 2000).

DISCUSSION

The marine fauna of São Tomé Island apparently shows a strong component of amphi-Atlantic species: five of the seven species reported here also occur in tropical waters of the western Atlantic. The amphi-Atlantic component of the marine fauna of the islands of the Gulf of Guinea is probably even higher than that of the Cape Verde Islands (references in Wirtz, 2001) but few species lists exist for that area (Gascoigne, 1996). The Canary Islands and Madeira Island have a much lower proportion of marine amphi-Atlantic species (references in Wirtz, 2001).

The fact that amphi-Atlantic species in the eastern Atlantic are proportionally more common towards the equator argues for a connection of the marine faunas of the eastern and western Atlantic by equatorial currents (Wirtz & Martins, 1993, and references therein). The Equatorial Undercurrent, flowing from west to east, appears to be the most likely candidate (Scheltema, 1971); see Muss et al. (2001) for a map of the area and the main current patterns in it. Wirtz (2001) therefore suggested that records of amphi-Atlantic species from the Canary Islands or from Madeira but not further south could be artefacts of much lower collecting efforts in southern areas. The records of *Actinostella flosculifera*, *Gnathophyllum americanum*, *Euapta lappa*, and *Goniaster tessellatus* at São Tomé, reported here, provide further arguments for this hypothesis.

Even though planktonic larvae could cross the Atlantic in as little as 35 to 105 days in the Equatorial Undercurrent (Scheltema, 1971), it remains unclear if the western and eastern Atlantic populations of amphi-Atlantic species are still linked genetically today or if their crossing the Atlantic is an historic event, perhaps from the time when the Atlantic was narrower than now. A molecular genetic study of the fish *Ophioblennius atlanticus* (Muss et al., 2001) suggested that eastern and western Atlantic populations of this species have been genetically distinct for about 5.5 million years and should probably be considered sister species. In contrast, there appears to be ongoing gene flow between American and African populations of the sea urchin *Eucladidaris tribuloides* (Lessios et al., 1999).

For help before, during, and after the dives, I am grateful to Luis Martins and to the management of the Rolas Island Resort. Eijiroh Nishi of the Yokohama National University, Yokohama, Japan, confirmed the identification of *Lygdamis wirtzi*. Christian Emig of the Station Marine d'Endoume, University of Marseille, France, confirmed the identification of *Phoronis australis*; a photo of this species from São Tomé can now be seen in his web page <http://www.com.univ-mrs.fr/DIMAR/Phoro/>. Oscar Ocaña confirmed the identification of *Actinostella flosculifera*. Cédric d'Udekem d'Acoz identified *Periclimenes platatea* and kindly allowed me to include this record here. Angus Gascoigne made possible a dive in Lagoa Azul. Karl Wittmann caught the *Gnathophyllum americanum*. Many thanks to them all.

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Submitted 28 October 2002. Accepted 15 June 2003.