

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/262300018>

# Expedition to São Tomé.

Article · June 2009

---

CITATIONS  
0

READS  
64

1 author:



[Peter Wirtz](#)

Independent Researcher

259 PUBLICATIONS 3,124 CITATIONS

[SEE PROFILE](#)

Some of the authors of this publication are also working on these related projects:



Biodiversity, phylogeography and connectivity in tropical Atlantic reefs [View project](#)



does not belong to a project [View project](#)



# Expedition to São Tomé

São Tomé is a volcanic Island. Photograph by João Gasparini

A chain of small volcanic islands extends from Cameroon to the southwest: first Bioko Island, only 50 km from the mainland, then Príncipe, followed by São Tomé, and finally, far out in the Atlantic Ocean, Annobón. The islands of São Tomé and Príncipe form their own state, the second smallest of Africa (only the state of the Seychelles is smaller still). In February 2006, the National Geographic Society sponsored an expedition to São Tomé Island: six marine biologists – five from Brazil and one from the Centro de Ciências do Mar at Faro – set out to survey the coastal fish fauna and to map the coral cover.



Turtle meat is being sold in the fish market. Photograph by Cláudio Sampaio

As our base, we rented a house in São Tomé city and also hired a large four-wheel-drive car. Some nearby places like the famous Lagoa Azul and Praia das Conchas we could thus explore independently. For more distant and offshore places, the

local SCUBA diving base run by Jean Louis Testori provided us with a fast boat and with diving equipment.

The marine biology of São Tomé is almost unexplored, except for a series of very old publications by the Portuguese scientist Osório. We therefore expected to find many species new to science there. The combination of marine biologists from both sides of the Atlantic had a good reason: The strong Equatorial undercurrent flows from the coasts of the western Atlantic to São Tomé. With a velocity of two to five km/h, it is the fastest current in the Atlantic; an animal riding in it (a fish larva, for instance) can cross from west to east in 35 - 105 days. We therefore also expected to find many unrecorded western Atlantic species at São Tomé.

Our expectations were fulfilled and surpassed! Among the many fish species we recorded, 59 were new for São



Photographing quadrats to quantify bottom cover. Photograph by Peter Wirtz

Tomé and Príncipe. Ten of these 59 were completely new for science; the other 49 have been recorded elsewhere but not yet at São Tomé and Príncipe. Most of the new species are small ones, like a 10 cm long beautiful red and white grouper, for instance, but one of them is a 50 cm long parrot fish ! As we predicted, many of the species we found were previously only known from the western Atlantic. A particularly noteworthy example is that of the golden-backed angelfish *Centropyge aurantonotus*, previously only known from Barbados to southern Brazil. Imagine our surprise when we saw it underwater during a dive at Sete Pedras, a small group of rocks off the eastern coast of São Tomé. Our analysis of the coastal fish fauna showed that more than a quarter of the species at São Tomé and Príncipe come from the western Atlantic !

For a genetic comparison, we collected tissue samples of many species of fishes. Are the species that on first

The Spotfin hogfish lives on both sides of the Atlantic. Photograph by Luiz Rocha



**TOP:** Inquisitive moray eel. Photograph by Peter Wirtz

**BOTTOM:** West African coral grouper. Photograph by Peter Wirtz

glance appear to be the same as those in the western Atlantic really the same or have they already started to diverge and to form separate species on our side of the Atlantic ?

In a quantitative approach, divers swam along a 20 m long line, identifying and counting all the fish 1 m to the left and to the right. Species richness per unit area (40 m<sup>2</sup>) during more than 100 of these so-called transect counts ranged from 10 to 16 fish species in São Tomé, comparable to 10 to 18 along the Brazilian coast. Such counts can also be used to determine macro-ecological patterns: In the western Atlantic, my Brazilian colleagues had found that the proportion of herbivorous fish (i.e. algae-eating fish) increases with decreasing latitude. In other words, herbivorous fish are more diverse and abundant in the tropics than in colder waters. Is the same true in the eastern Atlantic ? If yes, what could be the

New record for São Tomé: *Goniaster tessellatus*. Photograph by Peter Wirtz



reason for it ? Our data from São Tomé will be compared with similar counts at the Canary Islands, at Madeira Island, and at the Azores.

We photographed and collected not only fish but also invertebrates. We have found at least one new species of sea anemone. Another strange sea anemone species, seen only during night dives, is one more western Atlantic species recorded for the first time on our side of the Atlantic. I paid particular attention to small shrimps that live associated with sea anemones, horny coral and black coral, because these semi-transparent species are very easily overlooked and I have already had found several new species at Madeira and at the Cape Verde Islands. And of course: two species only known from the Cape Verde Islands and two undescribed symbiotic shrimps turned up on horny coral and on black coral in 20 and 50 m depth at São Tomé Island.

Associations of gobies with pistol shrimps (genus *Alpheus*) are common in the Red Sea and the Indopacific. In the tropical western Atlantic, only four such symbioses are known. At São Tomé and Príncipe I have detected the first goby-shrimp-symbiosis of the eastern Atlantic. It is quite extraordinary in many of its aspects.

The goby was an undescribed species; it has recently been described by two experts. The shrimp associated with the goby is not a pistol shrimp (as in all other goby-shrimp symbioses !), it belongs to a completely different family, the family shrimp lobsters (Axiidae). Apparently a goby-shrimp association - similar to that between gobies and pistol shrimps in the Indopacific and in the western Atlantic - has evolved again and completely independently in the tropical waters at São Tomé Island !

For their friendship I am grateful to my Brazilian colleagues, Sergio Floeter (the principal investigator of this expedition), Carlos Ferreira, João Gasparini, Luiz Rocha, and Cláudio Sampaio, and to Angus Gascoigne, who was our anchor on São Tomé Island.

#### REFERENCES

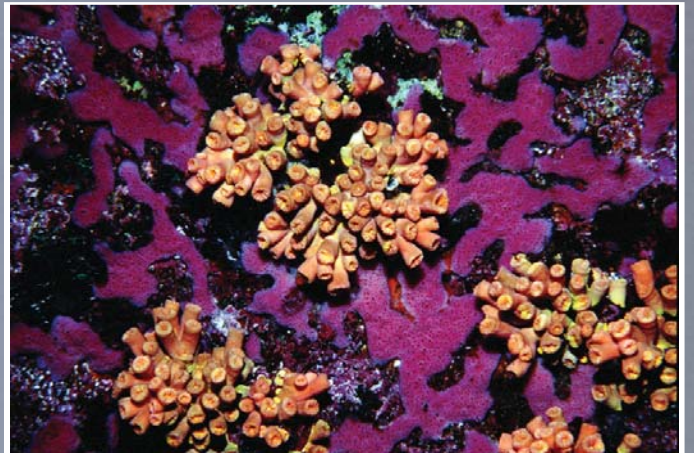
- Floeter, S. R., Rocha, L. A., Robertson, D. R., Joyeux, J. C., Smith-Vaniz, W., Wirtz, P., Edwards, A. J., Barreiros, J. P., Ferreira, C. E. L., Gasparini, J. L., Brito, A., Falcón, J. M., Bowen, B. W. & Bernardi, G., (2008). Atlantic reef fish biogeography and evolution. *Journal of Biogeography*, **35**, 22–47
- Wirtz, P. & Anker, A. (in print). Range extension for *Elysia timida* (Opisthobranchia, Sacoglossa) to São Tomé Island (eastern central Atlantic), with a film showing the curious locomotion of the species. *Marine Biodiversity Records*.
- Wirtz, P. & d'Udekem d'Acoz, C. (in print). Crustaceans associated with Cnidaria, Bivalvia, Echinoidea and Pisces at São Tomé and Príncipe Islands (eastern central Atlantic). *Arquipelago* 25A
- Wirtz, P., Ferreira, C.E.L., Floeter, S.R., Fricke, R., Gasparini, J.L., Iwamoto, T., Rocha, L., Sampaio, C.L.S. & Schliewen, U.K., (2007) Coastal fishes of São Tomé and Príncipe islands, Gulf of Guinea (Eastern Atlantic Ocean) – an update. *Zootaxa*, **1523**, 1–48.

**Peter Wirtz**

E-mail: [peterwirtz2004@yahoo.com](mailto:peterwirtz2004@yahoo.com)



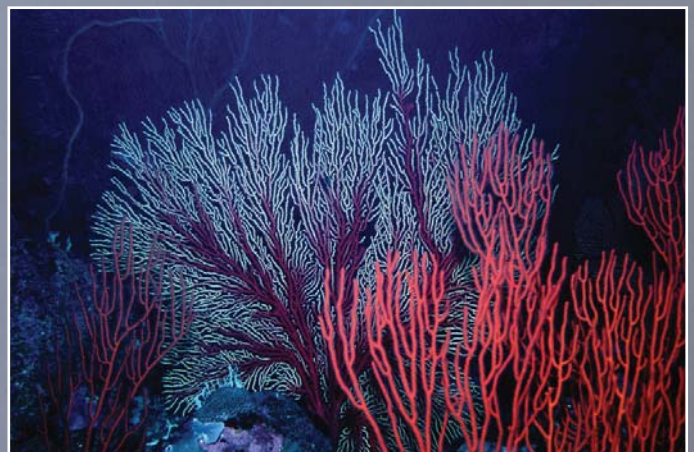
Golden cup coral, in full bloom at night. Photograph Peter Wirtz



Sponges and golden cup coral on a rock wall. Photograph Peter Wirtz



The Rock Hind also lives on both sides of the Atlantic. Photograph Peter Wirtz



Gorgonian forest below the thermocline in 40 m depth. Photograph Peter Wirtz.

#### Also Published in *JMBA*

Wirtz, P. (2003). New records of marine invertebrates from São Tomé Island. *JMBA*, **83**, 735–736.