



Molluscan Science - a World of Fascination and Beauty - Volume 2

The Seashells of Rólas, São Tomé

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MOLLUSCAN SCIENCE A WORLD OF FASCINATION AND BEAUTY VOLUME 2

SEASHELLS FROM RÓLAS, SAO TOMÉ

FELIX LORENZ & JANA KRATZSCH

Shells are the external skeleton of mollusks. They consist of calcium carbonate and the protein conchiolin. Mollusca comprise over 200,000 species, which makes it the second biggest phylum in the animal kingdom, after the Arthropoda.

Mollusks line in all climates and habitats, including the Antarctic, the Sahara, and the volcanic vents of the deep sea. There are several classes of mollusks, of which the following are the most popular:

Bivalves are characterized by a shell that consists of two valves. Their animals have no head. Most species are filter feeders. Clams and oysters are typical bivalves.

Gastropods have a single (univalve) shell that is usually coiled. This class comprises he majority of molluscan species. Most marine gastropods feed on algae, sponges, other invertebrates, and small fish, while others are scavengers. Garden snails, the queen conch, and cowries are gastropods.

Cephalopods (octopuses, squids, and pearl boats) have long tentacles, usually with suckers, and large eyes. They are predators of fish, mollusks, and crustaceans. The giant squid is the largest of all mollusks, attaining a length of 12 m and a weight of 275 kg. Octopuses and squids are important food source.

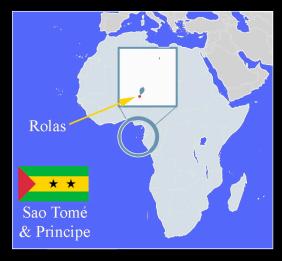
Mollusks play a key role in all terrestrial and marine habitats with their associated food chains. Therefore, the study of mollusks and their shells (malacology) is a science that also addresses threats to worldwide ecological communities in times of over-fishing, deforestation, pollution, and climate change.



SÃO TOMÉ AND PRINCIPE

The Democratic Republic of São Tomé and Principe is a small island nation in the Gulf of Guinea, off the coast of Gabon in West Africa. It consists of two islands of volcanic origin, of which São Tomé is the larger one. There are approximately 200,000 inhabitants.

Portugal originally colonized the island, which became independent in 1975, and Portuguese is the official language. The vast majority of Saotomese are Roman Catholics.



The economy of the country is based on agriculture, thanks to a rich volcanic soil that is ideal for the production of cocoa, coffee, and palm kernels. The infrastructure is rather rudimentary and tourism is not well-developed. Prices for food and accomodations are high. There is a slight threat of malaria and hepatitis A.

The island's climate is tropical, with heavy rainfalls and pleasant temperatures rarely exceeding 32°C. There is dense tropical rain forest, a steep, rocky volcanic shore and intermittent sandy beaches. The landmark of São Tomé is the Pico Cão Grande, a volcanic plug peak that rises to 663 m.

In the south of São Tomé Island, the tiny Ilhéu das Rólas is separated from the mainland by a narrow channel. The island lies directly on the equator and between 1915 and 1918 served as basis for triangulation and astronomical observations.

In January of 2020 we spent twelve days on Rólas Island, exploring and cataloging the molluscan fauna of this isolated spot. In total, we could identify 110 different species of gastropods and bivalves. We discovered a new species of *Cerithium*. Further, potentially new, species of different genera are currently under study.

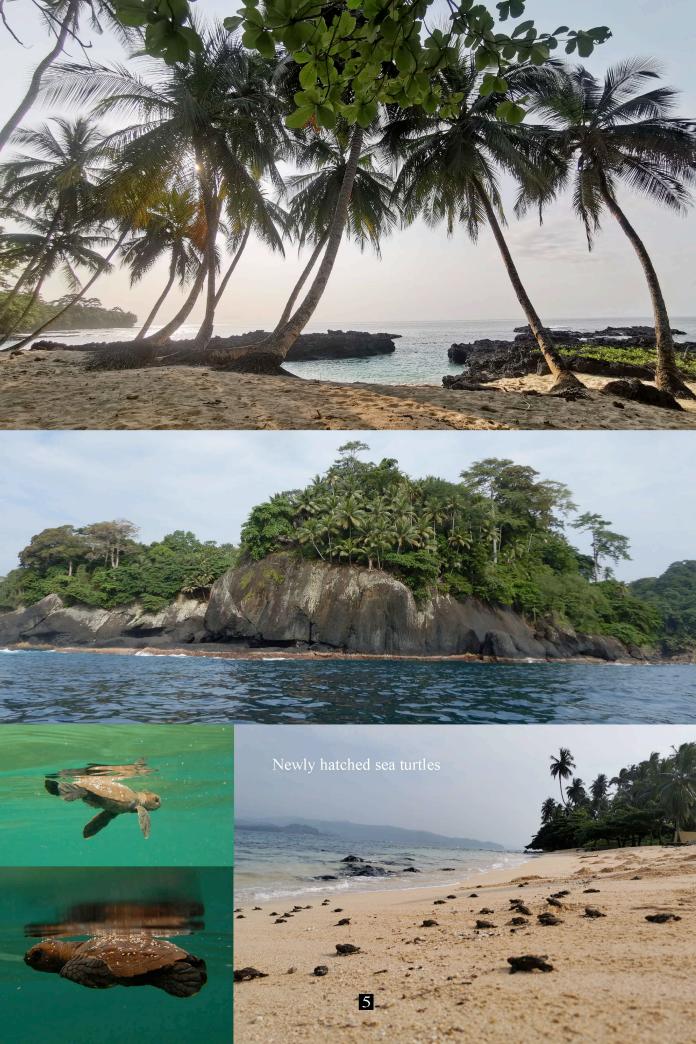
This booklet shall portray the diversity we encountered, from shallow water to a depth of 30 m. The illustrated shells, with very few exceptions, have been dead collected, from rock pools, the floors of underwater caves, and from beaches.

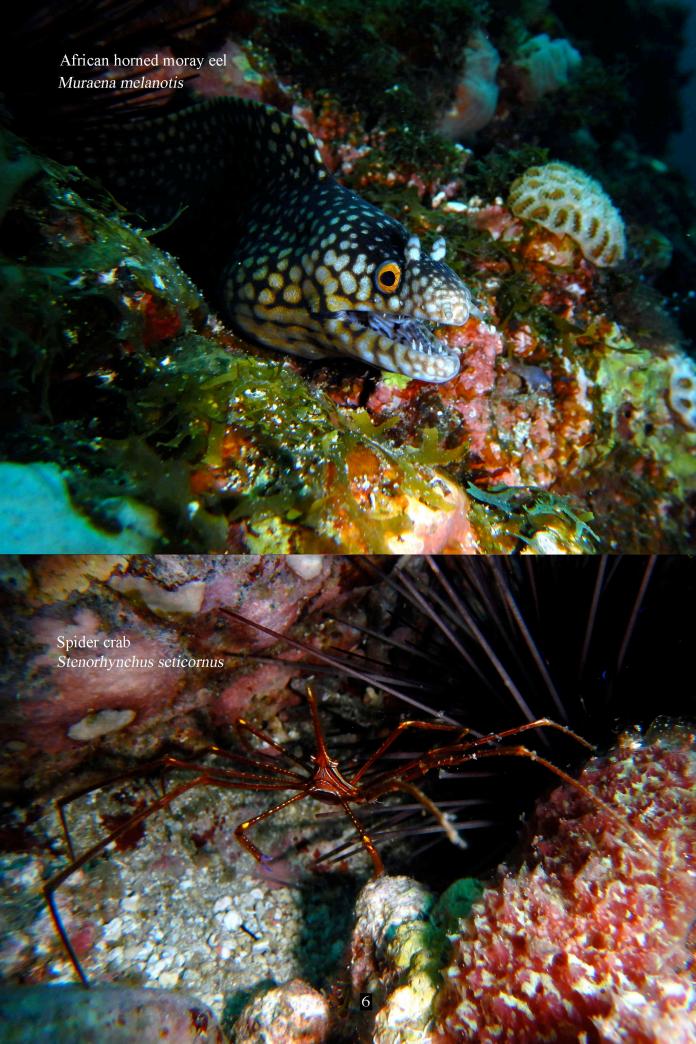
We wish to thank Anika Riberio Ferreira,
Luis Castelo Branco, Nelson and Apólo of
Dive-Tribe São Tomé, whose support made
this project possible. To Kirsten Clahr and
Beo Brockhausen, who convinced us of the
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And to the friendly and welcoming people of
São Tomé.

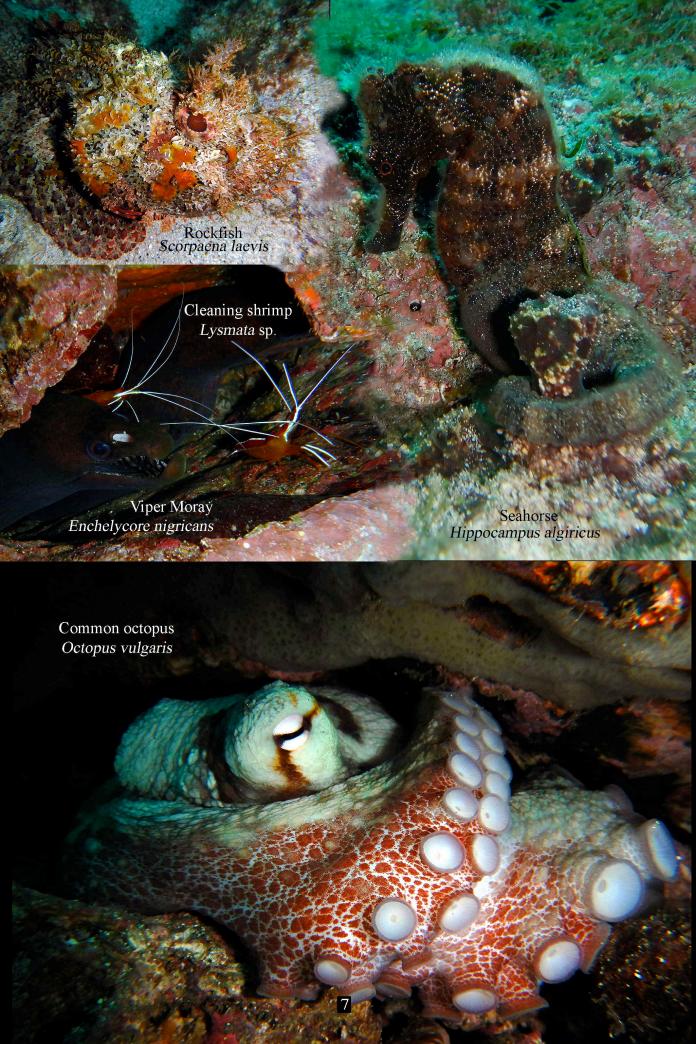
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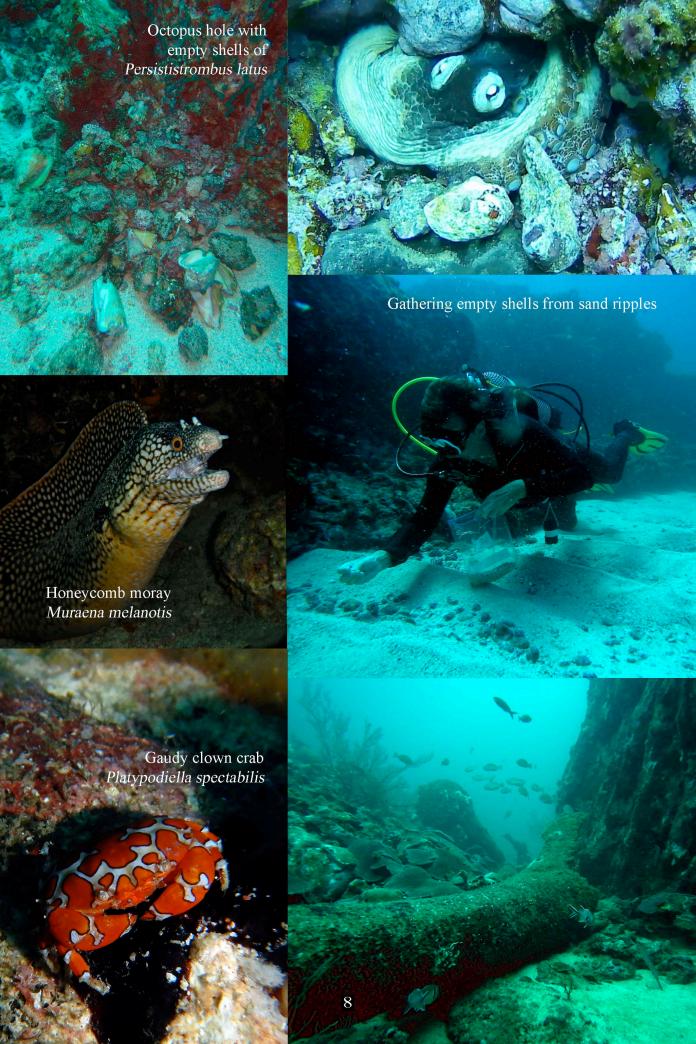






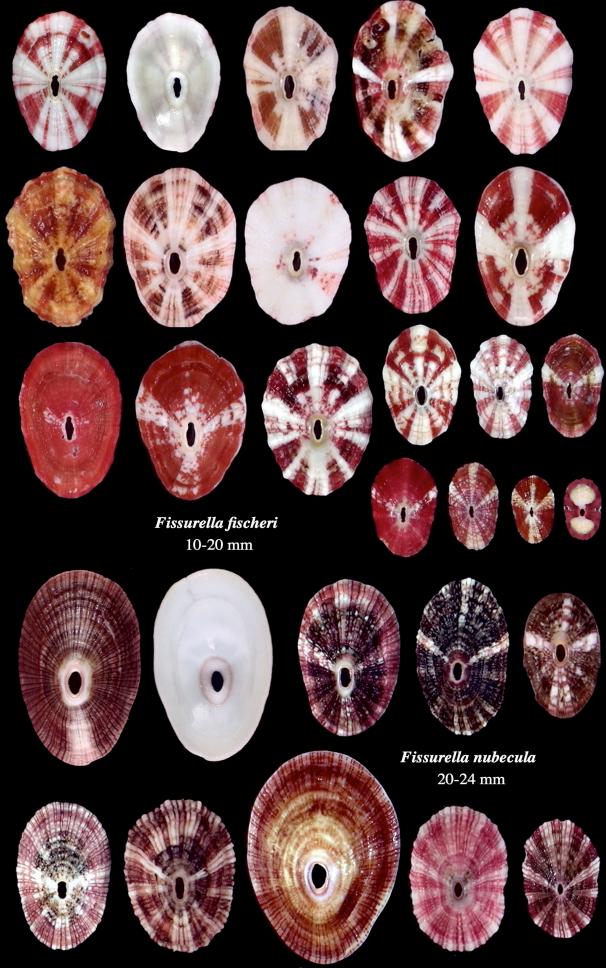
















Clanculus spadiceus

This distinctive, endemic species

16-18 mm

is common under rocks and in caves.

Like the abalone, top-shells (Trochidae)

have iridescent mother of pearl, which
becomes exposed in eroded specimens (on right).



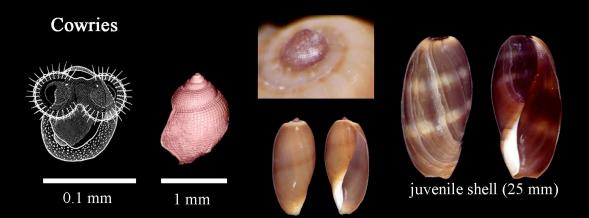


is perfectly camouflaged, as it is heavily encrusted. The purple operculum perfectly seals the aperture, protecting the animal against predators. While it is easy to spot these tiny "doors" in shellgrit at 20 to 30 m depth, its bearer is a rare find.



This variable species from shallow water was formerly identified as *C. atratum*, which is widespread in the Caribbean. Closer scrutiny revealed that the population from São Tomé represented a separate, undescribed species. It has just been named by Luigi Bozzetti in "Malacologia No. 106".





Most cowries begin their lives as planktonic larvae called veliger. After they settle, the larval shell grows with its coils well-discernible. Later, the larval shell is visible only as a small knob at the tip of the spire. Finally, the outer lip folds inwards, tooth-like structures. The adult shell does not grow any further (determined growth).



Luria lurida pulchroides 33-44 mm

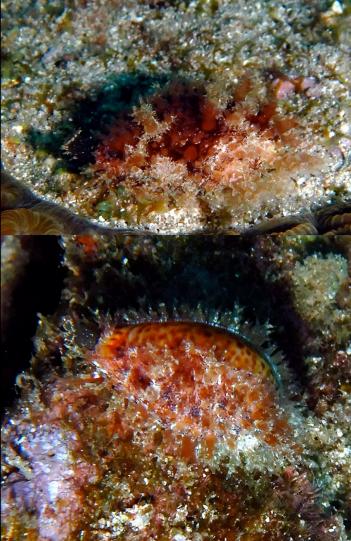
In São Tomé, a peculiar dwarf form of *L. lurida pulchroides* is quite common. It reaches only a third of the size of typical individuals.



In cowries, a fleshy mantle covers the shell, giving it a perfect camouflage in the habitat. The mantle has a left and a right lobe which deposits the pattern and deposit a glossy enamel.

Young shells are thin and the pattern is is often still absent (below).

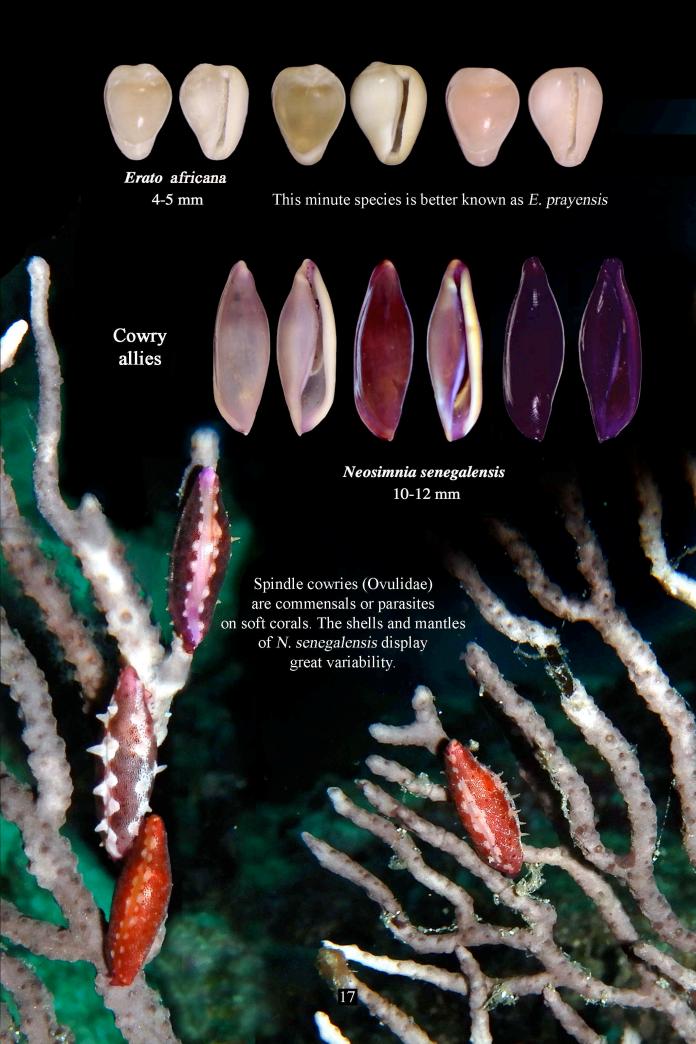






These two cowries are abundant along the West African coast, but uncommon in São Tomé. Empty shells of *T. stercoraria* were found in deep crevices of caves, and *Z. zonaria* on beaches and among rocks, in shallow water.







Littorina punctata 12-14 mm



Periwinkles are a large family with worldwide distribution. All inhabit the intertidal. One species is abundant on São Tomé.



Eunaticina africana



21mm



Notocochlis dillwynii 14 mm





Polinices lacteus 12 mm

Moon snails (Naticidae) are carnivorous and prey on bivalves and other marine invertebrates. They drill characteristic funnelshaped holes into the shells of their prey with the help of their rasping tongue (radula) and acid.





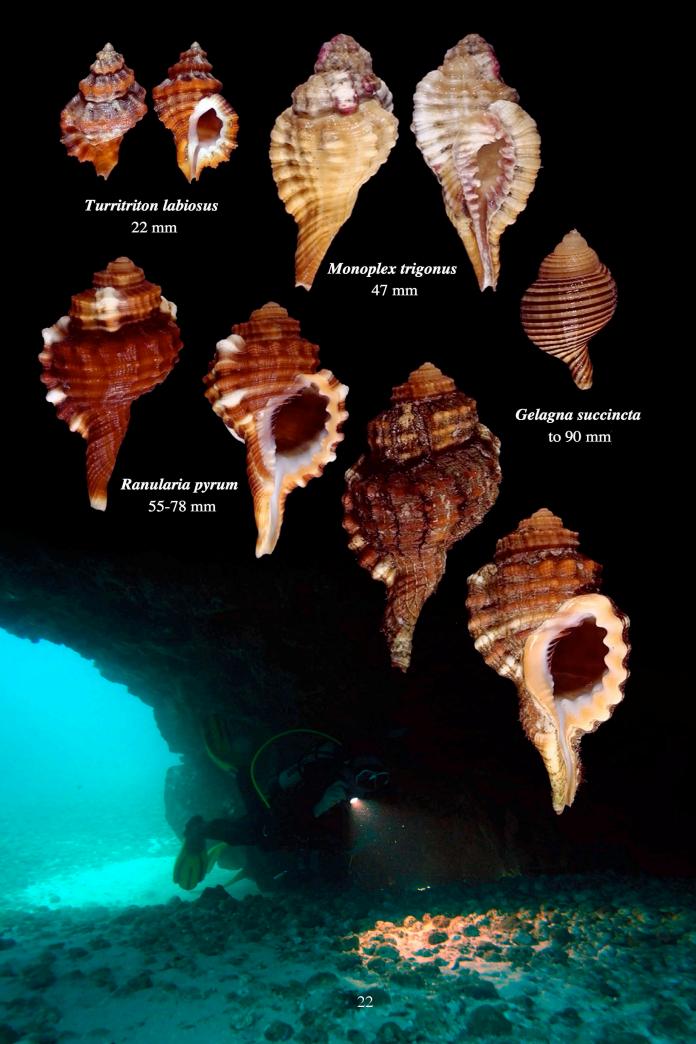






Tun shells are among the largest gastropods. The massive animal of *T. galea* feeds on sea cucumbers and other echinoderms. It is found throughout the Atlantic and the Mediterranean.

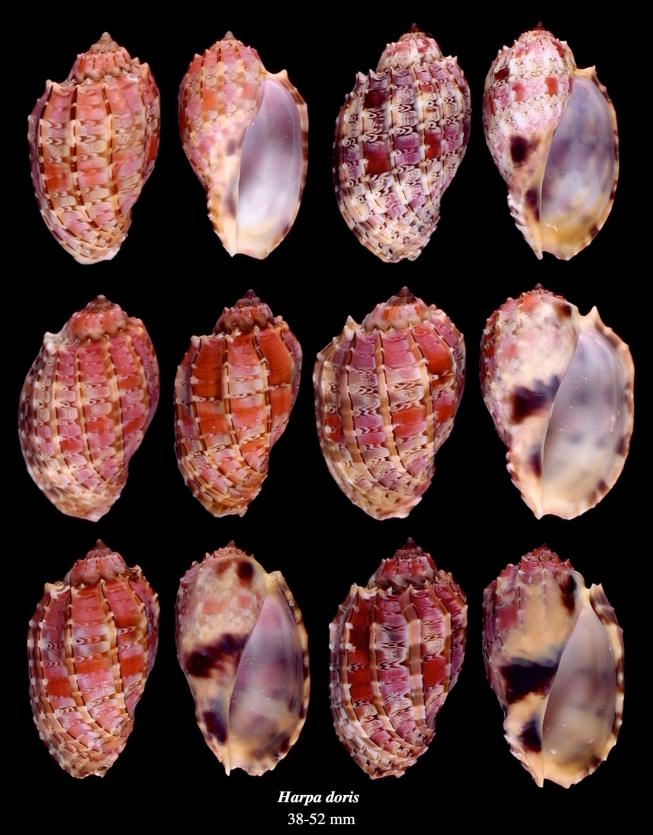
Tonna galea 84 mm (to 250 mm)



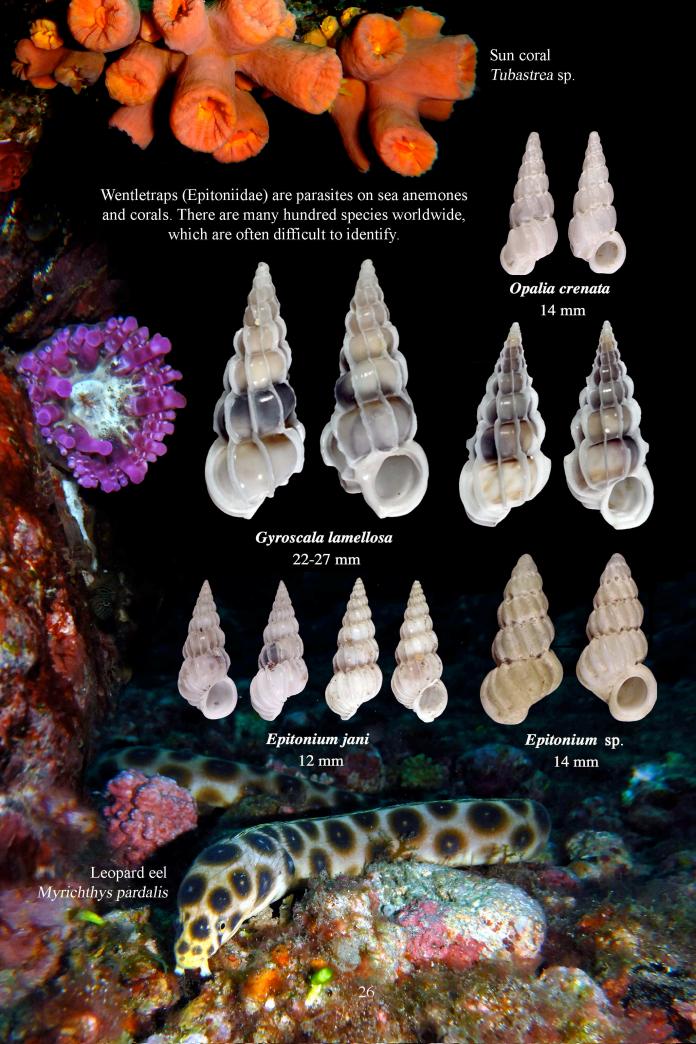


The hairy triton has a conspicuous periostracum, a coat of proteins involved in the formation of the shell. It has a wide range throughout the Atlantic and the Indo-Pacific.





The family of harp shells has many species in the Indo-Pacific. Only one inhabits the coast of West Africa. At São Tomé, the shells are of particular beauty due to their vibrant red colors. The best way to find a nice specimen is to inspect the hiding places of octopuses, who seem to have a particular interest in this species. Harp shells are nocturnal hunters for echinoderms and other invertebrates.





Colubraria canariensis 20-35 mm

There are many species in the family. At São Tomé we found small gatherings of half a dozen or more of these snails along the walls of caves where fish were resting.



Columbella adansoni 10-15 mm

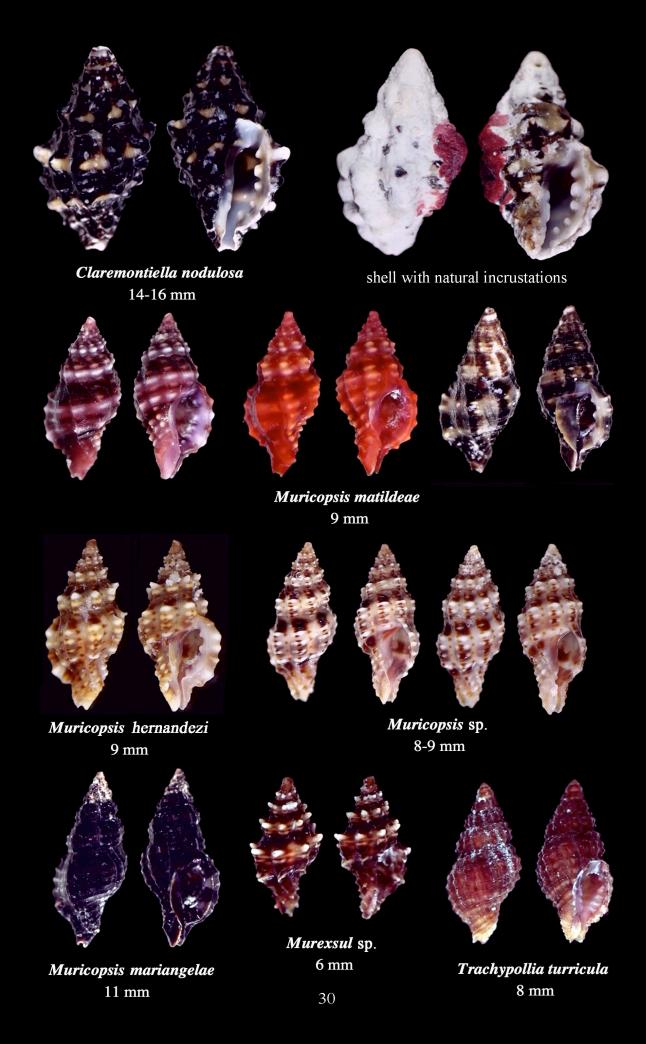
The delightful Dove Snails live under rocks in shallow water. Thousands of fresh shells wash up on the beaches of Rolas Is.



Mitrella parvula 8 mm

A swarm of Yellow Goatfish (Mulloidichthys martinicus)
The sea floor is covered in rhodoliths, or "maerl", coralline red algae.







12-20 mm



Gibberula thomensis
5-7 mm

Margin shells are members of the families Marginellidae and Cystiscidae.

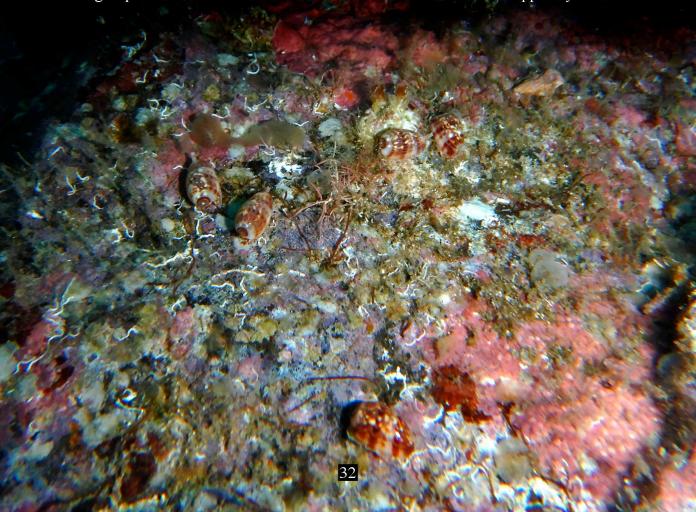
There are hundreds of species, many of which have very restricted distributions.

Some species are very colorful, but the majority have minute shells with subtle features. The family includes predators, scavengers, and even blood sucking parasites.

On our travels, we have discovered about 50 new species in various places.

We are confident that among our material from Rolas Island there will more discoveries, as the diversity of Margin Shells we encountered was phenomenal.

This group of *Gibberula thomensis* was found under a rock anchor dropped by fishermen.







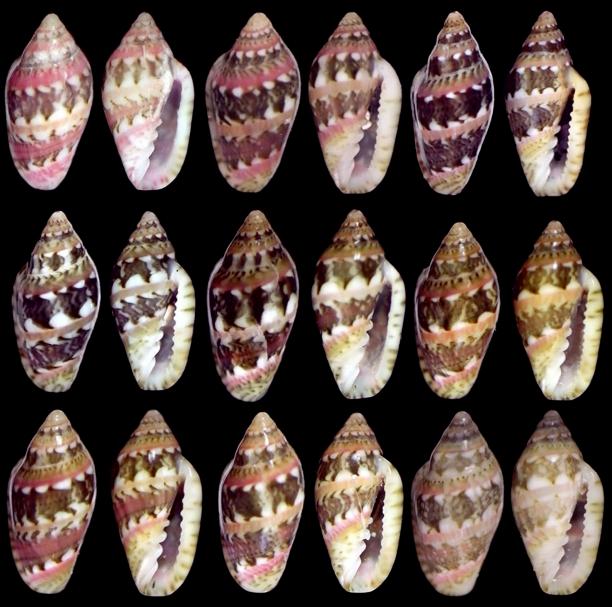


Marginella cf. gloriosa
7 mm

Marginella liparozona var. 9 mm



Marginella melvilli 8-10 mm

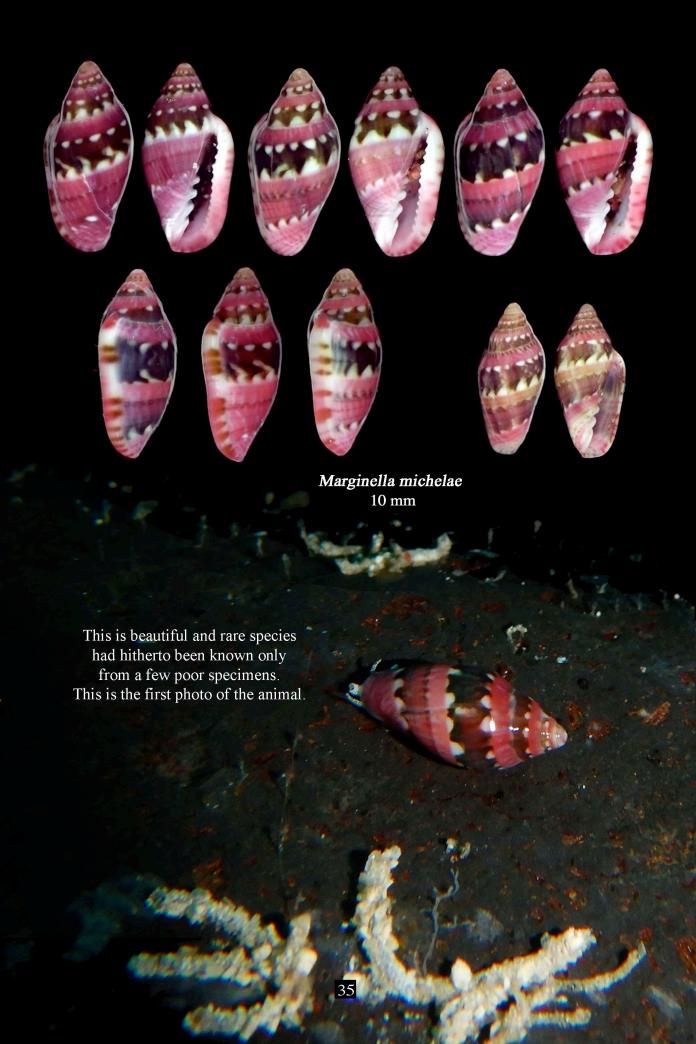


Marginella spinacia 7-8 mm

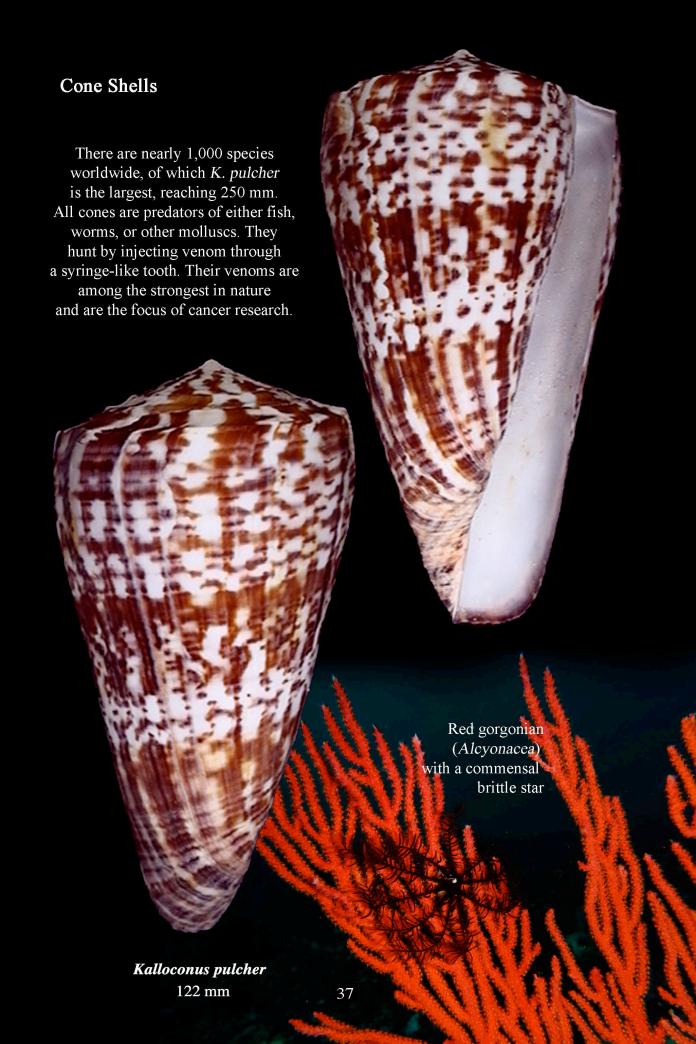


Marginella sp. 8 mm

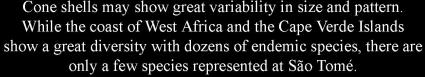
Marginella cf. michelae 8 mm







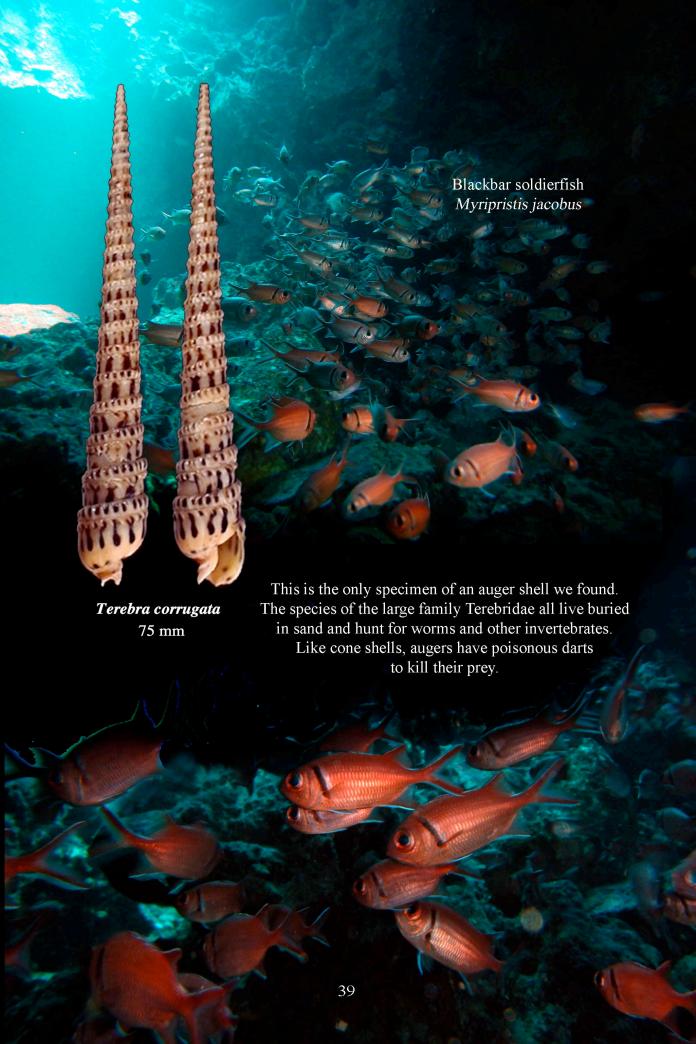






Monteiroconus tabidus 25-28 mm

with periostracum





The "turrids" are a group of several thousand species subclassified in ten or more separate families. Very few experts worldwide are working on this fascinating playground of evolution. The minute *Paradoxa* is actually a member of the family Muricidae, but is easily confused with a turrid.





8 mm





7 mm

Scalenostoma sp. 17 mm

18 mm

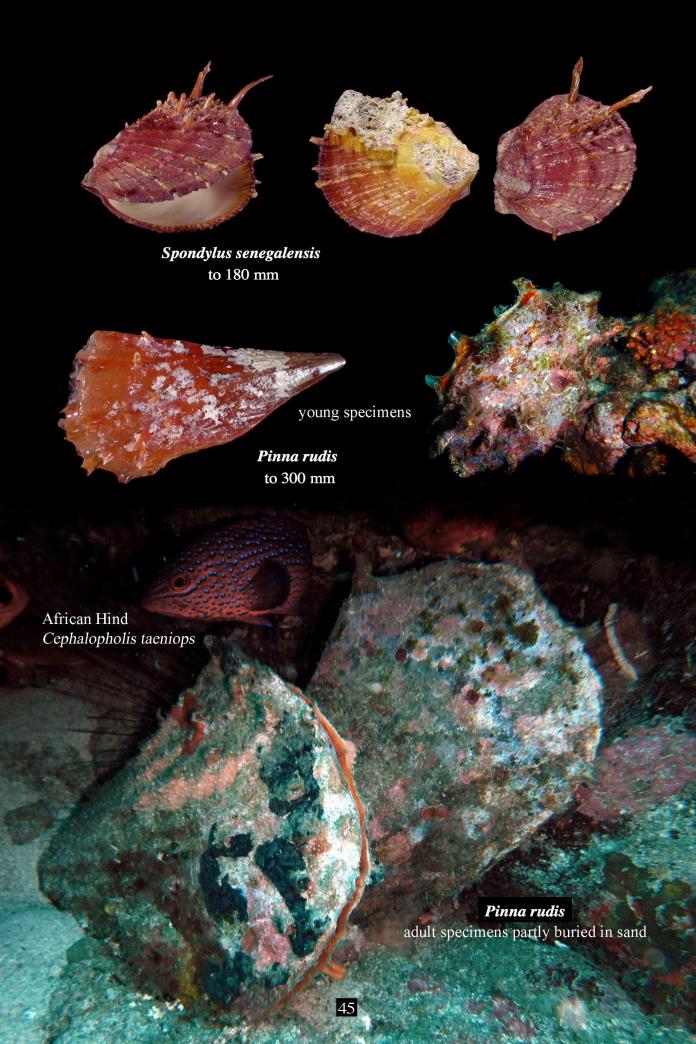


Bulla mabillei 35-55 mm









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The Molluscan Science Foundation, Inc. (MSF)

As a non-profit organization stationed in Owings Mills, Maryland, USA, the MSF supports the study, documentation, and conservation of mollusks and their habitats worldwide, by recording molluscan diversity, morphology, biology and biochemistry, and by providing an educational opportunity for discussion and direct observation in the field of malacology.

In addition, education in schools and other public institutions are in a primary focus, to pass on our fascination and awareness for the wonders of nature to our youth, and to future generations.

For more information visit our website molluscan-science.org





This book features seashells and their habitats from a remote place off the coast of West Africa. The tiny islet of Rólas lies off the southern Tip of the island nation of São Tomé and Principe, directly on the equator. This is the first richly illustrated portrait of more than 100 species of seashells from Rólas, with numerous photos of their living animals, some never illustrated before.

The specimens depicted herein have been obtained by associates of the Molluscan Science Foundation, Inc. (MSF), and are now deposited in the public collection of this non-profit organization.