

New record of *Typhinellus labiatus* (Cristofori & Jan, 1832) (Gastropoda: Muricidae) from São Tomé and Príncipe and discussion about its classification and geographical distribution

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ABSTRACT. The natural history of the islands of São Tomé and Príncipe is briefly discussed and a new record of a large typhine from Sao Tomé and Príncipe is commented. The examined specimens belongs to *Typhinellus* and are compared with the type species *T. labiatus* (Cristofori & Jan, 1832), occasionally better known as *T. sowerbii* (Sowerby, 1833), a junior synonym. A list of the Muricidae collected in these islands is given in the appendix.

INTRODUCTION

São Tomé and Príncipe Islands are a group of small islands, relict of an ancient volcanic mountain range situated off the west African coast. They consists of two principal islands, São Tomé and Príncipe. They lie along a magmatic geological feature known as the Guinea line which is a flaw in the African tectonic plate more or less 1500 kms long that has served as a channel for magmas for million of years. The Guinea line extends across the ocean continent and magmatic extrusions up through it have given rise to major oceanic and continental relief extending from southwest to northeast, including the islands of Annobon, São Tomé, Príncipe and Bioko and the mainland features of Mount Cameroon, the Cameroon highlands and the Jos plateau of Nigeria (Drewes & Wilkinson, 2004).

The islands of Annobon, São Tomé and Príncipe are long known for the high level of endemism in their biota and some taxa are shared in the latter two. The three islands are separated from each other and from the West African coast by ocean depth up to 3000 m. Príncipe islands is geologically the oldest. São Tomé being the largest with 850 square kilometers is situated on the equator line, south of Príncipe island and with other small islets (Ilheu das Cabras, Ilheu Santana, Sete Pedras, Ilheu das Rolas, Ilheus Gabado/San Miguel and Ilheu Coco near São Tomé; Ilheu Tinhosa grande, Ilheu Tinhosa pequena, Ilheu Bone de Joquei,

Pedra Gale and Ilheu dos Mosteiros near Príncipe). São Tomé, Príncipe and the small islets form the Republic of São Tomé and Príncipe.

One of the junior authors (SG) has travelled several times to both Islands, collecting eight times in São Tomé and twice in Príncipe. Collecting has been in various habitats and with different methods (scuba diving, using tangle nets or washing dead corals and small stones) both by day and night producing a sampling from 5 to 40 m depth.

Previous research has been conducted by a number of earlier collectors as summarized by Fernandes & Rolán (1993) who themselves collected extensively in the islands primarily by snorkelling. Other recent works concerning muricids from the islands include Fernandes & Rolán (1990), Rolán & Fernandes (1991), Houart & Rolán (2001). Thanks to the introduction of scuba facilities in the area it was also possible more recently to explore the rocky coastlines more intimately and other new species of Muricidae have been described : Houart (2005), Rolán & Gori (2007), Houart & Gori (2008).

Among the various muricids collected in both Islands (see appendix), a large typhine has led to a careful and refined examination.

Typhinae species have a small size, rarely exceeding 40 mm in height, and have the particularity to grow hollow tubes (Fig. 1) situated between each pair of varices. These anal tubes are gradually closed and broken during the growth of the shell, only the last tube

remains open and can be long to very long when intact (Fig. 17).

The situation of these tubes compared to the axial varices is used among other things as a tool for their generic classification. These tubes may be either situated half way between the varices or nearest to preceding or succeeding varix, or even originate from the varix itself. The shell of Typhinae also has a sealed siphonal canal, four or very rarely five varices per whorl and, in some genera, a partition (Fig. 1), which is a lamellar outgrowth, or erect plate, joining the last varix of the whorl with the previous one. The edge of the aperture is erect and forms an entire peristome.

The examined protoconchs of all the Recent species are paucispiral, consisting of 1.5 to 2 whorls.

Abbreviations

JLD: Coll. Jean-Louis Deleamarre – P: Principe – PR: Coll. Peter Ryall – RH: Coll. Roland Houart – SG: Coll. Sandro Gori – ST: São Tomé – lv: live-taken specimen – dd: empty shell.

Descriptions of spiral sculpture use the terminology introduced by Merle (1999, 2001):

P - Primary cord; P1 - Shoulder cord; P2-P6 - Primary cords of the convex part of the teleoconch whorl.

SYSTEMATICS

Family **TYPHINAE** Cossmann, 1903

Genus *Typhinellus* Jousseume, 1880

Type species by original designation: *Typhis sowerbii* Broderip, 1833 = *Murex labiatus* Cristofori & Jan, 1832, Mediterranean, East Atlantic

The shells belonging to *Typhinellus* are characterized in having a partition. There are four flange-like, frilled varices, constricted above the aperture and flaring at its abapical end; the varical flange of the last teleoconch whorl extends to almost the tip of the siphonal canal. The anal tube does not originate from the varix but is situated near the preceding varix, and adpressed to the preceding partition.

Typhinellus labiatus (Cristofori & Jan, 1832)

Figs 1-29

Murex fistulatus Risso, 1826 (not *Muricites fistulatus* Schlotheim, 1820).

Murex labiatus Cristofori & Jan, 1832

Typhis sowerbii Broderip, 1833

Murex tetrapterus Bronn, 1838

Murex syphonellus Bonelli in Bellardi & Michelloti, 1841

Typhis (Typhinellus) tetrapterus var. *protetrapterus* Sacco, 1890

Typhis sowerbyi var. *fulva* Pallary, 1906

Typhis sowerbyi var. *minor* Pallary, 1906

Typhis (Cephonochelus) recens Nordsieck, 1972

Typhis sowerbyi elongatus Settepassi, 1977

Material examined from São Tomé and Príncipe

São Tome. In fine sand and silt, 6 m, 1 lv (PR) (Figs 11-14); Ubabudu Reef, NE São Tomé, 00°15'804" N, 06°45'569" E, 20 m, 1 dd (PR); Lagoa Azul, NW São Tomé, 1 lv (SG) (Figs 6-7); Lagoa Azul, NW São Tomé, 10-14 m, 1 lv (SG); Lagoa Azul, NW São Tomé, 15 m, 1 lv (SG)

Príncipe. Bahia das Agulhas, 01°36'06" N, 07°20'55" E, 15 m, 1 lv (SG) (Figs 9-10); Praia Evora, San Antonio, 01°38'24" N, 07°26'34" E, 7 m, on muddy sand, 1 dd (SG).

DISCUSSION

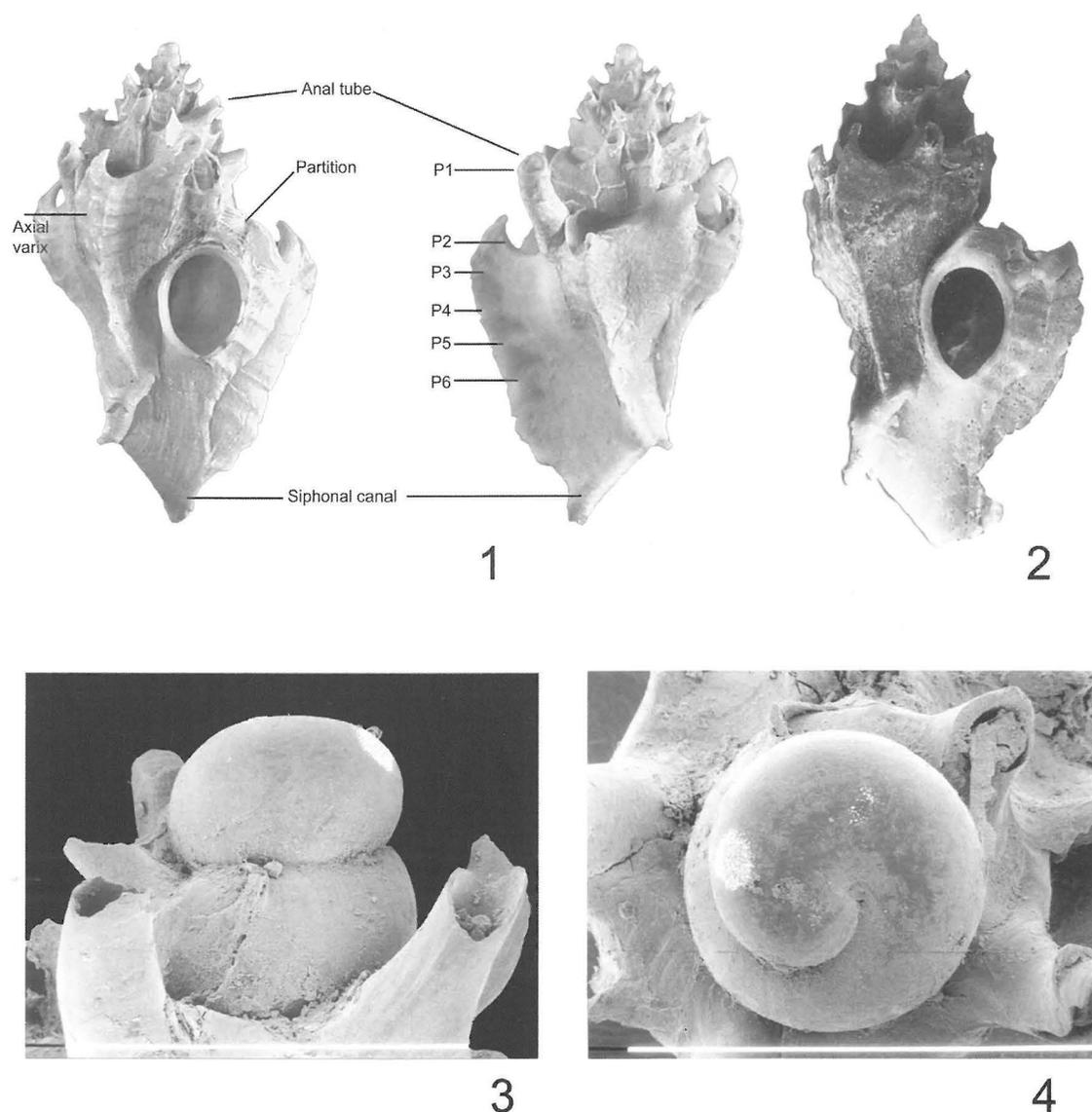
Keen (1944: 56) regarded *Murex labiatus* as a possible *species dubium* (sic) because Bellardi (1873) had earlier placed *Murex labiatus* in the synonymy of *M. fistulosus* Brocchi, 1814. Her decision was tentative because she had not seen a copy of their work and later Gertman (1969: 156) considered it was best to follow Keen's suggestion and consider *Murex labiatus* as a *nomen dubium*. However, the lectotype of *Murex labiatus* was figured afterwards by Pinna (1971: pl. 76, fig. 12) and by Pinna & Spezia (1978: pl. 35, fig. 1). *Typhis labiatus* was described from the Pliocene of Castell'Arquato and is undoubtedly conspecific with the Recent *Typhinellus sowerbii*. A Pliocene specimen from Castell'Arquato is here illustrated for comparison (Figs 23-24). *Typhinellus labiatus* was also commented and illustrated by Houart (2001).

There are no stable differences observed between the Mediterranean shells and the specimens collected in São Tomé and Príncipe. The specimens from West Africa are larger, occasionally almost twice as big as the Mediterranean shell but also with at least one additional teleoconch whorl. The spire looks also to be lower but we could not yet examine a specimen from Sao Tomé or Príncipe with an intact apex, all of them having the first whorls eroded, so that :

1. The spire could be as high than in *T. labiatus* from the Mediterranean if we add the protoconch and teleoconch whorls 1 and 2.

2. We don't know exactly the number of teleoconch whorls in the specimens from São Tomé and Príncipe, although the larger ones probably has 6 or 6.5 teleoconch whorls vs 4.5 or 5.5 in the examined Mediterranean specimens; as a reminder also, one of the syntypes of *Typhis sowerbii* is a large specimen of 24.5 mm (Fig. 2).

The axial sculpture consists of 4 rounded varices with a sharp lamellae, ending with a short, strongly recurved spine at shoulder. The anal tube is strongly backward recurved, forming an angle of approximately 65-85° with the axis of the shell. The last anal tube (when intact) is long and hollow, the others are gradually shorter and closed. They are strongly adpressed to the preceding partition. The spiral sculpture consists of low cords, more apparent on the



Figures 1-4 - *Typhinellus labiatus* (Cristofori & Jan, 1832)

1. Nomenclature. Livorno, Italy, 13.6 mm, (RH).

2. Syntype of *Typhis sowerbii* Broderip, 1833, Mediterranean, 24.5 mm, BMNH 197461.

3-4. Protoconch. SEM J. Cillis, IRSNB, scale bars 1000 μ m.

varices, ending as more or less recurved, short spines on varices. There are 6 primary cords (Fig. 1), P1-P6, occasionally shallow or almost obsolete in some specimens, sometimes with one to three secondary cords between P2 and P3 and/or P3 and P4, or P5 and P6.

The protoconch has not yet been examined. The protoconch of Mediterranean specimens consists of 1.5-1.75 whorls (Figs 3-4).

Other specimens of *T. labiatus* were reported from the western Atlantic. Gertman (1969: pl. 1, fig 5a-5c) illustrated a typical specimen of 17 mm from the Leeward Islands, near Nevis and reported the species

also from Portobelo, Panama, from off Texas and from Egmont Key, Florida. Other specimens from the western Atlantic are occasionally larger and broader (Figs 25-29) but like Gertman (1969: 156), we also feel that these differences are within the range of variation of *T. labiatus*.

A specimen collected in Principe by SG was eating a small bivalve.

Fernandes & Rolán (1993: 38) reported they had collected in São Tomé a species they recorded as *Typhis cf. clarki* Keen & Campbell, 1964. We suspect these authors were referring to the species which is the basis of this paper as one of the current authors (PR)

has material from the late Francisco Fernandes herein illustrated (fig. 11-14).

Houart (1997: 84-85, figs. 234, 235) illustrates a specimen of *Typhina expansa* (Sowerby, 1873) as *Typhis (Talityphis) expansus* from the geographically close area of Ile Banié, Gabon. However this species lives in a different substrata of very fine and thick sediment washed down the nearby rivers. The animal lives submerged in detritus and only the tip of the canal exits the surface (PR personal observation). In the islands, however, *T. labiatus* live on silty or muddy

sand (SG). *Typhina* and *T. expansa* can be distinguished from *Typhinellus* by having a varical flange broadly expanded adapically, extending to midway of the siphonal canal; by having a broader last teleoconch whorl relative to the shell height, and by having the anal tube near the preceding varix, but not adressed as in *Typhinellus*.

The examination of the syntypes of *T. belcheri* proved *Typhina* to be congeneric with *Talityphis* (Houart, 2002).

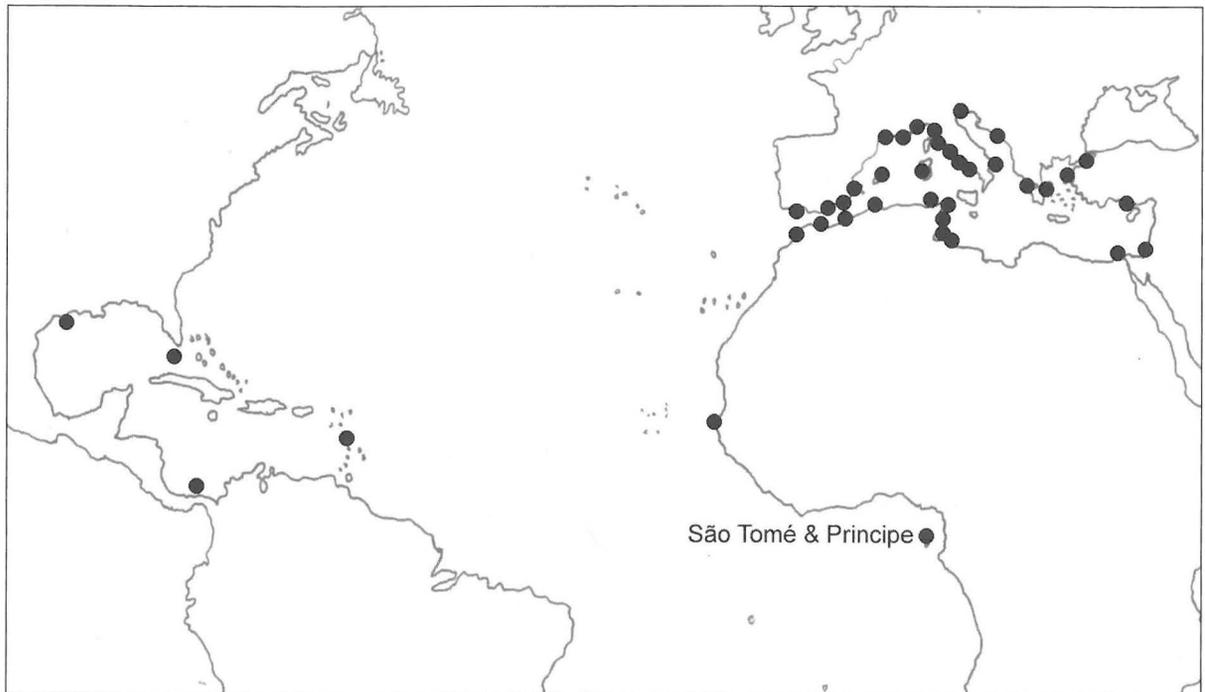


Figure 5. Distribution map of *Typhinellus labiatus*

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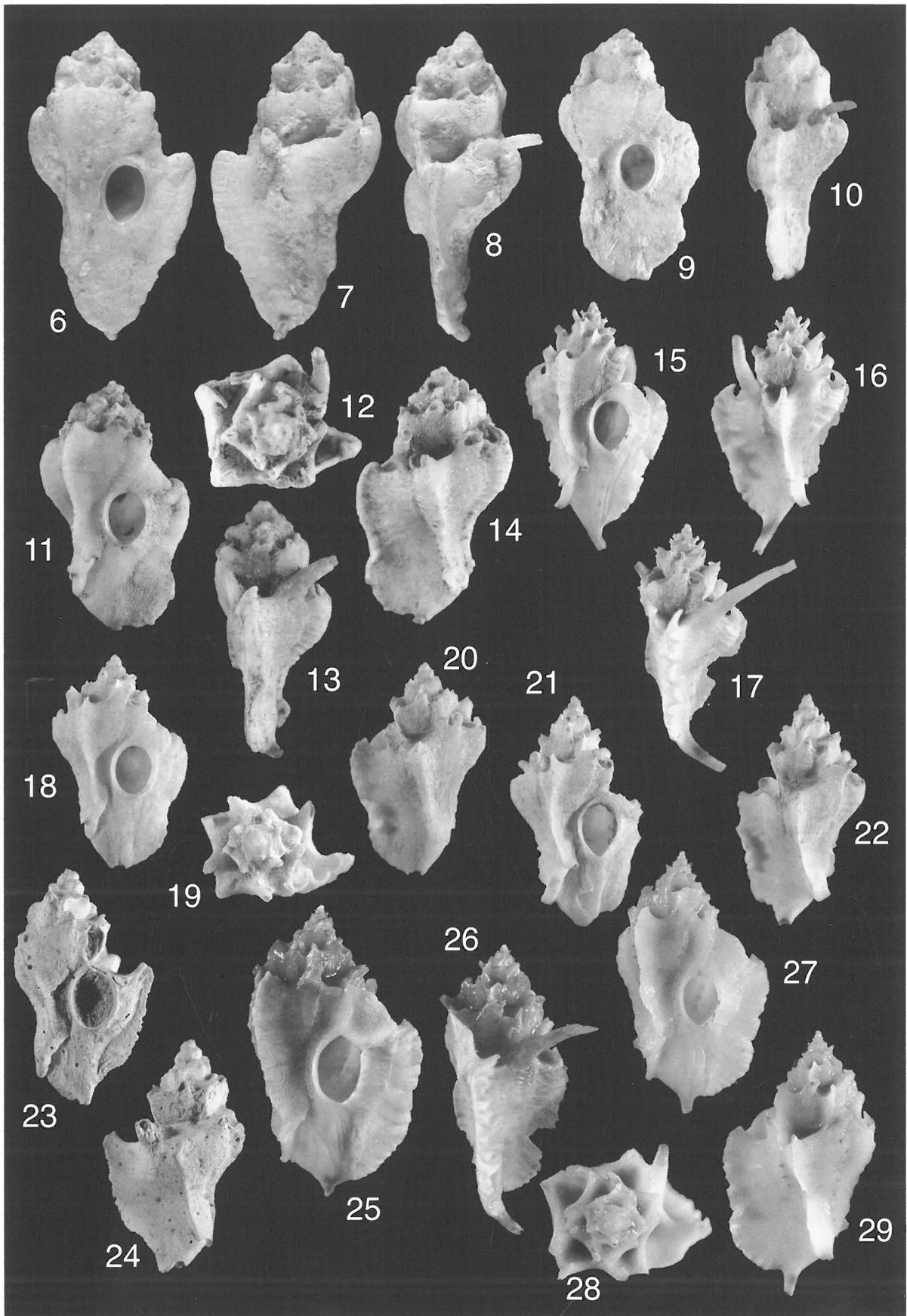
Campos and Armando Pires, that with patience and skill help him during the researches

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Figures 6-29 - *Typhinellus labiatus* (Cristofori & Jan, 1832)

- 6-8. São Tomé, Lagoa Azul, 31.2 mm, (SG); 9-10. Bahia das Agulhas, Principe, 15 m, 24.1 mm, (SG); 11-14. Off Sao Tomé, 6 m, in fine sand/silt, 21.9 mm, (PR); 15-17. Kerkennah, Tunisia, 20.1 mm, (RH); 18-20. Kerkennah, Tunisia, 15.2 mm, (RH); 21-22. Mallorca, 16.6 mm, (RH); 23-24. Castell'Arquato, Piacenza, Italie, Pliocene, 16.8 mm, (RH); 25-26. Portobelo, East Panama, 60 m, 28.7 mm, (RH); 27-29. Portobelo, East Panama, 60 m, 26.5 mm, (RH).



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Appendix

List of Muricidae (excluding Coralliophilinae) collected in São Tome (ST) and Principe (P)

(*) = endemic

<i>Bolinus cornutus</i> (Linnaeus, 1758) (ST)	Fernandes & Rolán, 1993
<i>Hexaplex rosarium</i> (Röding, 1798) (ST & P)	JLD, PR, SG, Fernandes & Rolán, 1993
<i>Favartia (Favartia) emersoni</i> (Radwin & D'Attilio, 1976) (ST)	SG, new record
<i>Favartia (Murexiella) bojadorensis</i> (Locard, 1897) (ST)	SG, new record
<i>Homalocantha melanamathos</i> (Gmelin, 1791) (ST & P)	SG, new record
<i>Muricopsis delemarrei</i> Houart, 2005 (ST & P) (*)	JLD, PR, RH, SG
<i>Muricopsis hernandezi</i> Rolán & Gori, 2007 (ST) (*)	PR, RH, SG
<i>Muricopsis matildeae</i> Rolán & Fernandes, 1991 (ST) (*)	JLD, PR, RH, SG, Fernandes & Rolán, 1993
<i>Muricopsis principensis</i> Rolán & Fernandes, 1991 (P) (*)	PR
<i>Muricopsis rutilus mariangelae</i> Rolán & Fernandes, 1991 (ST & P) (*)	JLD, PR, RH, SG, Fernandes & Rolán, 1993
<i>Muricopsis testorii</i> Houart & Gori, 2008 (ST) (*)	PR, RH, SG
<i>Pradoxa confirmata</i> Fernandes & Rolán, 1989 (ST & P) (*)	JLD, PR, RH, SG, Fernandes & Rolán, 1993
<i>Pradoxa thomensis</i> Fernandes & Rolán, 1989 (ST & P) (*)	PR, RH, SG, Fernandes & Rolán, 1993
<i>Inermicosta inermicosta</i> (Vokes, 1871) (ST & P)	JLD, Fernandes & Rolán, 1993
<i>Morula nodulosa</i> (C.B. Adams, 1845) (ST & P)	JLD, PR, SG, Fernandes & Rolán, 1993
<i>Trachypollia turricula</i> (Maltzan, 1884) (ST & P)	PR (maybe reported in Fernandes & Rolán, 1993 as <i>Ocinebrina suga</i>)
<i>Stramonita haemastoma</i> (Linnaeus, 1767) (ST & P)	JLD, Fernandes & Rolán, 1993
<i>Thais nodosa</i> (Linnaeus, 1767) (ST & P)	JLD, Fernandes & Rolán, 1993
<i>Typhinellus labiatus</i> (Cristofori & Jan, 1832) (ST & P)	PR, SG (maybe reported in Fernandes & Rolán, 1993 as <i>Typhis cf clarcki</i>)

A few species mentioned by Fernandes & Rolán (1993) are questionable or/and actually junior synonyms. They were mostly quoted from older records:

Murex turbinatus Lamarck, 1822. Is a synonym of *Hexaplex duplex* (Röding, 1798)

Murex hoplites Fischer, 1876. Is a synonym of *Hexaplex duplex* (Röding, 1798)

Murex tumulosus Sowerby, 1841. Is a synonym of *Bolinus cornutus* (Linnaeus, 1758) (see above)

Muricopsis blainvillei Payraudeau, 1826. Is a synonym of *Muricopsis cristatus* (Brocchi, 1814)

As mentioned by Fernandes & Rolán (1993: 45 [C9]): "we have not found this species and the record is probably due to the confusion with some of the recently described species and mentioned in the list", this makes reference to *Muricopsis mariangelae* and *M. matildae* (E. Rolán in litt.).

Ocinebrina suga (Fischer-Piette, 1942). See above under *Trachypollia turricula*

Typhis cf. clarcki Keen & Campbell, 1964. See above under *Typhinellus labiatus*

Thais ascensionis (Quoy & Gaimard, 1832). Is a synonym of *Thais nodosa* (see above)

Thais neritoidea (Linné, 1767). Is a synonym of *Thais nodosa* (see above)