



## An overview of the recent vermetids (Gastropoda: Vermetidae) from Brazil

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### Abstract

Literature and malacological collection records were reviewed to compile a list of the Vermetid taxa from Brazil. The total number of taxa so far recorded is 16: 2 of *Dendropoma*, 10 of *Petalconchus*, 1 of *Thylaeodus* and 3 of *Thylacodes*. The present study registered new occurrences of Vermetidae for the Brazilian coast, broadening the knowledge of the group as well as the geographical distribution of these taxa.

Keywords: Checklist, *Dendropoma*, *Petalconchus*, *Thylaeodus*, *Thylacodes*.

### Resumo

Uma visão geral dos vermetídeos (Gastropoda: Vermetidae) recentes do Brasil. Registros da literatura e coleções malacológicas foram revisados para compilar uma lista dos taxa de vermetídeos do Brasil. O número total de taxa registrados até o momento é 16: 2 de *Dendropoma*, 10 de *Petalconchus*, 1 de *Thylaeodus* e 3 de *Thylacodes*. O presente estudo registrou novas ocorrências de Vermetidae para a costa brasileira, ampliando o conhecimento do grupo, bem como a distribuição geográfica destes taxa.

Palavras-Chave: Lista, *Dendropoma*, *Petalconchus*, *Thylaeodus*, *Thylacodes*.

### Introduction

The vermetids are a distinct group of sessile gastropods, which have a great morphological plasticity characterized by irregular shells growth, adapted to the substratum (Savazzi 1996, Schiaparelli & Cattaneo-Vietti 1999). They represent a distinct group among gastropods, having mobility only in the early, hatched stages (Keen 1961). To propose a new vermetid species, either generic or specific identification, from empty shells or tube fragments are often impossible. The great variability of shell sculpture and epibionts covering becomes difficult to make a diagnosis (Kelly 2007). The difficulty to collect

vermetid samples also generates a problematic feature in taxonomic studies. These organisms are rarely considered in marine communities studies (Keen 1960), presumably because of their complex taxonomy (Bieler 1996) and distinct shell morphology, difficult the recognition of species diversity in the field. Besides, these gastropods cannot be adequately classified without the correlation between the soft parts anatomy and shell features (Keen & Morton 1960). Coiling pattern and shells ornamentation change with the environment, such as turbidity of water and topography of the substratum

(Scheuwimmer & Nishiwaki 1982, Schiaparelli & Cattaneo-Vietti 1999). Vermetids live in intertidal or shallow subtidal habitats, in tropical and temperate waters between 44°N and 44°S (Safriel 1975), not only in warm and oxygenated waters (Keen 1961, Calvo et al. 1998), but also under the cold upwelling conditions off northern Chile (Pacheco & Laudien 2008). On the coast of Brazil, can be found vermetid bioconstructions with other organisms, such as corals and coralline algae, in the Northeast and Southeast coasts, between 3°S (northern coast of Ceará) and 22 °S (northern coast of Rio de Janeiro), including the oceanic islands (Laborel & Kempf 1965, Soares-Gomes et al. 2001).

The Brazilian vermetids were the subject of a few investigations during the 19<sup>th</sup> and beginning of 20<sup>th</sup> centuries. The French naturalist Alcide d'Orbigny was the first to describe the occurrence of a new species *Petalconchus varians* (d'Orbigny 1841) from Rio de Janeiro (RJ) in the results of expeditions to the Atlantic and Pacific coasts of South America.

Extensive taxonomic and biological investigations were undertaken on Brazilian shallow water vermetids by Jacques Laborel and Marc Kempf during the decades of 60 and 70. They described vermetid formations along the Brazilian coast and oceanic islands compared with those of Bermuda and Mediterranean (Laborel & Kempf 1965). Based on literature records, Laborel (1977) highlights a possible impoverishment of the reef building vermetids in the South Atlantic. The zoological survey carried out in 1979 by the Cambridge Expedition to Saint Paul's Rocks (mid equatorial Atlantic Ocean), reported the occurrence of *Dendropoma irregulare* (as *Dendropoma* sp.) in the checklists of species (Edwards & Lubbock 1983a,b). More recently, a new species of *Petalconchus*, which lives in intertidal rocky shores in Southeastern Brazil (Ponta de Itaipú, Rio de Janeiro State), was described; the species was *Petalconchus myrakeenae* Absalão & Rios, 1987.

The Brazilian vermetids are still poorly known. According to Rios (1994) and Spotorno (2009) only 6 species of vermetids have been recorded so far in the Brazilian coast, despite in being remarkably numerous (Spotorno pers. obs.). Recent studies are leading to the description of new species in recent years, but these studies

are just beginning for the Brazilian fauna. The purpose of this study is to summarize, in a checklist, available knowledge of all taxa recorded from Brazil until today.

## Material and Methods

A list of recent marine vermetids from Brazil was compiled from the literature and based on the material deposited in malacological collections (MOFURG and MNRJ). The literature sources used were original research papers published in scientific journals or articles published in scientific annals, books, dissertations and thesis were also included in the list.

The list is organized according to the accepted species/taxon name, authorities, date of publication, places of occurrence by states, and synonymy. Doubtful and/or requiring confirmation taxa are marked with an asterisk. The results are summarized in table 1. Figure 1 illustrate regions, states and oceanic islands of Brazil considered in this paper.

Abbreviations: **MOFURG** – Museu Oceanográfico “Prof. E. C. Rios” malacological collection, **MNRJ** – Museu Nacional do Rio de Janeiro malacological collection; Regions: **N** – Northern Coast, **NE** – Northeastern Coast, **SE** – Southeastern Coast, **S** – Southern Coast; Oceanic Islands: **ASPSP** – São Pedro e São Paulo Archipelago, **FN** – Fernando de Noronha Archipelago, **RA** – Rocas Atoll, **TI** – Trindad Island; States: **AP** – Amapá, **PA** – Pará, **MA** – Maranhão, **PI** – Piauí, **CE** – Ceará, **RN** – Rio Grande do Norte, **PB** – Paraíba, **PE** – Pernambuco, **AL** – Alagoas, **SE** – Sergipe, **BA** – Bahia, **ES** – Espírito Santo, **RJ** – Rio de Janeiro, **SP** – São Paulo, **PR** – Paraná, **SC** – Santa Catarina, **RS** – Rio Grande do Sul.

## Results

The total number of taxa of recent marine vermetid so far recorded for Brazil is 16, arranged in 4 genera: *Dendropoma*, *Petalconchus*, *Thylaeodus* and *Thylacodes* (Table 1). Ten taxa looks to be endemic, having exclusive occurrence on the Brazilian coast, and the three requiring confirmation will be in further analyzed.

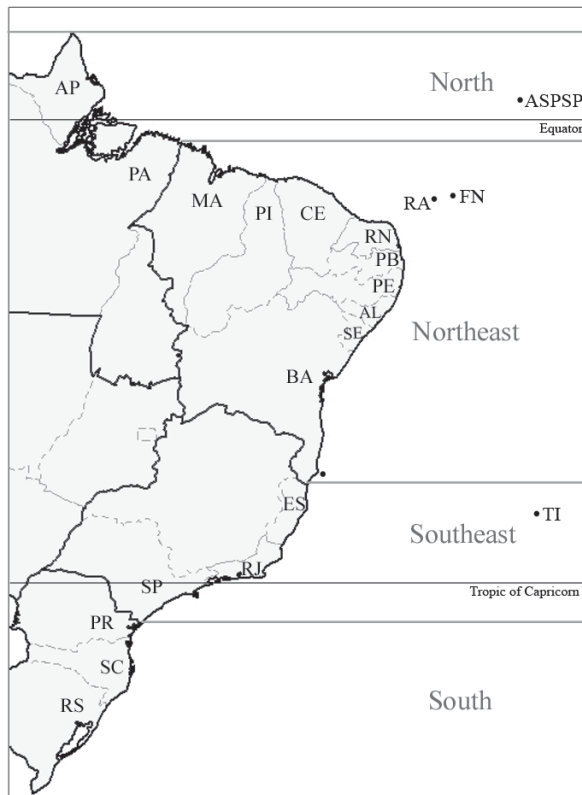


FIGURE 1. Map of the Brazilian coast indicating regions, states, and oceanic islands.

Nine of the 16 taxa recorded at the generic level are also being studied, characterizing new occurrences in the Brazilian coast, and probably species new to science. Among vermetids most taxa were recorded in shallow water, between 0 and 20m deep; continental shelf, bathyal or abyssal records are lacking for the group. *Thylacodes decussatus* (Gmelin, 1791) is the most representative, being the only species recorded at all depths. Northeastern and Southeastern coasts are the most studied regions, represented by the occurrence of 11 and 8 taxa, respectively, more than the other regions together. Most records are coastal (15), with a few taxa (5) reported from oceanic islands (Table 1). The present study registered new occurrences of Vermetidae for the Brazilian coast, increasing the knowledge of the group as well as the geographical distribution of these taxa.

## Checklist of Recent marine vermetids recorded from Brazil

Family Vermetidae Rafinesque, 1815

Genus *Dendropoma* Mörch, 1861

### *Dendropoma irregulare* (d'Orbigny, 1842)

**Synonym.** *Spiroglyphus nebulosus* Dillwyn, 1817; *Spiroglyphus irregularis* (Orbigny, 1842) (Abbott 1974: 101).

**Occurrence.** PA, BA (Abrolhos Archipelago), RA, ASPSP, FN, TI: MOFURG; MNRJ; Edwards & Lubbock (1983a: 58,59); Leal (1991: 95); Rios (1994: p 67); Spotorno *et al.* (2003: 02); Spotorno (2009: 95); Soares *et al.* (2011: 44).

**Remarks.** Colonial forms usually, embedded in encrusting coralline algae, except for the shell opening. Deeply entrenched in the substrate or merely cemented on top of substrate. Considered an important reef bioconstructor of Rocas Atoll, Fernando de Noronha and Abrolhos Archipelago (Laborel & Kempf 1965, Soares *et al.* 2011).

### *Dendropoma* sp.

**Synonym.** *Dendropoma* sp.1 (Leal, 1991: 96); *Dendropoma* sp. (Spotorno 2009: 116).

**Occurrence.** MA, AL (Maceió), BA (Salvador and Abrolhos Archipelago), RA, FN: MOFURG; MNRJ; Spotorno (2009: 116).

**Remarks.** This taxon has been mixed with *D. irregulare* in MOFURG, and in Rios (1985; 1994). It distinguishes from *D. irregulare* by the very wide shell diameter, sculpture, operculum and reproductive traits. Solitary or living in clusters with *D. irregulare*, encrusting coralline algae and/or encrusting sponge *Monanchora arbuscula* Duchassaing & Michelotti, 1864.

Genus *Petalococonchus* Lea, 1843

### *Petalococonchus erectus* (Dall, 1888)

**Occurrence.** AP (off Cabo Cassiporé), AP-PA (Foz do Amazonas Basin), AL (Maceió), RA:

Table 1. Vermetid taxa reported from Brazilian coast.

Taxa	Region					Oceanic Island					Depth		
	N	NE	SE	S	ASPSP	FN	RA	TI	0-20m	20-100m	>100m		
<b><i>Dendropoma</i></b>													
<i>D. irregulare</i>	x	x	x		x	x	x	x	x				
<i>Dendropoma</i> sp.		x				x	x		x				
<b><i>Petalococonchus</i></b>													
<i>P. erectus</i>	x	x					x					x	
(*) <i>P. cf. erectus</i>		x	x										
<i>P. myrakeenae</i>			x						x				
<i>P. varians</i>		x	x	x		x	x	?	x				
(*) <i>P. cf. macrophragma</i>		x	x										
<i>Petalococonchus</i> sp.1		x							x				
<i>Petalococonchus</i> sp.2		x	x						x				
<i>Petalococonchus</i> sp.3			x										
<i>Petalococonchus</i> sp.4							x	x	x				
<i>Petalococonchus</i> sp.5		x										x	
<b><i>Thylaeodus</i></b>													
<i>Thylaeodus</i> sp.					x				x				
<b><i>Thylacodes</i></b>													
<i>T. decussatus</i>		x	x						x	x		x	
<i>Thylacodes</i> sp.		x							x				
(*) <i>Thylacodes</i> sp.												x	

MOFURG; MNRJ; Rios (1994: 67); Spotorno (2009: 117).

(\*) ***Petaloconchus cf. erectus*** (Dall, 1888)

**Occurrence.** MA (Manuel Luiz Coral Banks), PB (João Pessoa), PE (Serrambi, Tamandaré), AL (Maragogi, Japaratinga, Maceió), BA (Abrolhos Archipelago), ES (Guarapari): Amaral (1997: 87, 91, 111); Amaral *et al.* (2008: 65).

**Remarks.** Registered as associated fauna in *Millepora braziliensis* Verrill, 1868 colonies, according to Amaral (1997) and Amaral *et al.* (2008).

***Petaloconchus myrakeenae*** Absalão & Rios, 1987

**Occurrence.** RJ (Ponta de Itaipu, Niterói): Absalão & Rios (1987: 415)

**Remarks.** Know only from the type locality.

***Petaloconchus varians*** (d'Orbigny, 1841)

**Occurrence.** CE, PE (Serrambi, Itamaracá Island), RN (Natal, Pipa), PB (João Pessoa), PE (Recife), AL (Maceió, Paripueira), BA (Abrolhos Archipelago, Salvador, Itaparica Island), ES, RJ (Arraial do Cabo, Cabo Frio, Ilha Grande, Angra dos Reis, Maricá, Mangaratiba, Paraty), SP (Ilhabela, São Sebastião, Ubatuba, Alcatrazes Island, Guarujá, Santos, Iguape), SC (Florianópolis, Camboriú, Bombinhas, Canasvieiras, Armação, Campeche Island, Porto Belo Island, Itapema, Laguna), PR (Guaratuba), TI (?), FN, RA: MNRJ; MOFURG; Rios (1994: 67); Spotorno (2009: 118); Soares *et al.* (2011: 44); Breves-Ramos (2012: 33-35).

**Remarks.** Very variable growing, with erect tube projecting above the substratum. Dense aggregations of shells forming compact colonies (100-200 mm in length).

(\*) ***Petaloconchus cf. macrophragma***  
Carpenter, 1857

**Occurrence.** MA (Manuel Luiz Coral Banks), PB (João Pessoa), PE (Serrambi, Tamandaré), AL (Maragogi, Japaratinga, Maceió), BA (Abrolhos

Archipelago), ES (Guarapari): Amaral (1997: 87, 91, 111); Amaral *et al.* (2008: 65).

**Remarks.** Registered as associated fauna in *Millepora braziliensis* colonies, according to Amaral (1997) and Amaral *et al.* (2008). *P. macrophragma* occurs from Baja California to Panama (Keen 1971: 403).

### ***Petaloconchus sp.1***

**Occurrence.** BA (Abrolhos Archipelago): Spotorno (2011: 44).

**Remarks.** This taxon is characterized by purple-brown head-foot and yellow mantle border pigmentation when living. Registered as associated fauna in *Millepora spp.* colonies, with erect tube projecting more than 100mm above the substrate, according to Oliveira (2011). Colonial forms usually, also found embedded in brain coral *Mussismilia braziliensis* (Verrill, 1868).

### ***Petaloconchus sp.2***

**Occurrence.** BA (Abrolhos Archipelago, Salvador), RJ (Cabo Frio): MNRJ, Spotorno (2011: 52).

**Remarks.** This taxon is usually solitary, characterized by bright yellow head-foot pigmentation when living.

### ***Petaloconchus sp.3***

**Occurrence.** RJ (Campus Basin): MOFURG.  
**Remarks.** This material is deposited in the in the MOFURG malacological collection.

### ***Petaloconchus sp.4***

**Synonym.** *Petaloconchus sp.1* (Leal 1991: 94), *Vermetus varians* d'Orbigny, 1841 (Lopes & Alvarenga 1955: 166), *Petaloconchus cf. varians* (Kempf & Laborel 1968: 11, 13), *Petaloconchus cf. varians* (Matthews & Kempf 1970: 22), *Petaloconchus varians* (Eston *et al.* 1986: 43)

**Occurrence.** AR, FN, TI: MOFURG; Leal (1991: 94).

**Remarks.** Does not build reefs as *P. varians*,  
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but is found only as isolated, small colonies.

### ***Petaloconchus* sp.5**

**Occurrence.** CE (Fortaleza): MNRJ; MOFURG.

**Remarks.** Dredged from deep waters, at 240-260 m depth, in Canopus Bank, off Ceará, NE Brazilian coast. This material is deposited in the MNRJ and in the MOFURG malacological collections.

Genus *Thylaeodus* Mörch, 1860

### ***Thylaeodus* sp.**

**Synonym.** Vermetidae sp. (Spotorno et al. 2009: 180).

**Occurrence.** ASPSP: Spotorno et al. (2009: 180).

**Remarks.** Solitary or living in small clusters under the encrusting sponge *Darwinella rosacea* Hechtel, 1965.

Genus *Thylacodes* Guettard, 1770

### ***Thylacodes decussatus* (Gmelin, 1791)**

**Synonym.** *Serpula decussata* Gmelin, 1791; *Serpulorbis decussatus* (Gmelin, 1791)

**Occurrence.** BA (Camamu Bay, Salvador, Belmonte, Abrolhos Archipelago); ES (Guarapari); RJ (Arraial do Cabo, Cabo Frio, Macaé): MNRJ; MOFURG; Rios (1994: 67); Simone (2001: 183); Spotorno (2009: 119); Spotorno (2011: 62).

**Remarks.** This species is usually solitary with wide shell diameter, registered as associated fauna to *Millepora* spp. colonies, to the brain coral *Mussismilia braziliensis* in coralline reefs and in rhodolith banks (Spotorno 2011, Spotorno et al. 2011).

### ***Thylacodes* sp.**

**Occurrence.** BA (Abrolhos Archipelago): Spotorno (2011: 69).

**Remarks.** Small groups of organisms usually,

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embedded in brain coral *Mussismilia braziliensis*. This taxon is characterized by a medium shell diameter and head foot with a mosaic of yellow and orange spots in olive green background pigmentation when living.

### **(\*) *Thylacodes* sp.**

**Occurrence.** RS (off Solidão): MOFURG.

**Remarks.** 2 shell fragments collected from deep waters, at 240 m depth. This material is deposited in the MOFURG malacological collection.

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