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SHORT NOTE / NOTA CURTA

First record of the vermetid *Petalconchus varians* (d'Orbigny, 1841) on floating marine debris at Ilha Grande, Rio de Janeiro, Brazil *

*Primeiro registro do vermetídeo *Petalconchus varians* (d'Orbigny, 1841) em lixo marinho flutuante na Ilha Grande, Rio de Janeiro, Brasil*

André Breves^{@, 1}, Luis Felipe Skinner¹

ABSTRACT

This note aims to do the first record of the vermetid gastropod *Petalconchus varians* rafting on floating marine debris. This record of the occurrence of the species at Ilha Grande (Rio de Janeiro, Brazil) is within its distribution range in the West Atlantic Ocean coast, however its distribution could be extended through antropogenic mechanisms. The dispersion of vermetids through floating debris should be investigated given the high potential of invasion by vermetids due to the increase in waste production

Keywords: Bioinvasion, coastal zone, Gastropoda, rafting, Vermetidae.

RESUMO

Este trabalho tem como objetivo realizar o primeiro registro do vermetídeo *Petalconchus varians* em lixo marinho flutuante. Esse registro de ocorrência da espécie na Ilha Grande (Rio de Janeiro, Brasil) está dentro da extensão de sua distribuição na costa oeste do Oceano Atlântico, no entanto a sua distribuição pode ser ampliada através de mecanismos antropogênicos. A dispersão de vermetídeos através de lixo flutuante deve ser investigada, tendo em vista o grande potencial de invasão dos vermetídeos devido ao aumento da produção de lixo.

Palavras-chaves: Bioinvasão, Gastropoda, rafting, Vermetidae, zona costeira.

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1. INTRODUCTION

The dispersion of benthic organisms through natural substrata and anthropogenic solid waste has been reported in oceans of the world (Barnes & Fraser, 2003; Thiel & Gutow, 2005; Farrapeira, 2011). Rafting can be the main vector of dispersion to some invertebrate species with many groups of organism such as sponges, barnacles, polychaetes, bryozoans and bivalves reported on floating debris (Thiel & Gutow, 2005).

In the Brazilian coast, 122 species of macrobenthic invertebrates transported on abiogenic solid marine debris were listed, relating their prevalence to the substrate types (Farrapeira, 2011). From these species, 13 were sedentary mollusks and none of them vermetid.

To the present, there is none reference on the literature signaling the presence of vermetid species on marine debris or being transported by rafting. In the present paper we record for the first time the vermetid gastropod *Petalconchus varians* (d'Orbigny, 1841) on floating marine debris and being transported by rafting.

2. MATERIAL AND METHODS

This study was performed during October 2012 in Dois Rios beach (23°11'01,6"S and 44°11'22,03"W), located in a conservation unit, in the open ocean side of Ilha Grande, south coast of Rio de Janeiro State, Brazil.

Despite the presence of other macrobenthic invertebrates such as hydrozoans and lepadid barnacles, only the vermetid

specimens were collected. They were removed manually from debris, placed in plastic bags, fixed and preserved in 70% alcohol. The collected specimens were deposited in the Marine Invertebrates Collection of Departamento de Ciências (DCIEN), Faculdade de Formação dos Professores (FFP), Universidade do Estado do Rio de Janeiro (UERJ).

3. RESULTS AND DISCUSSION

Six specimens of the vermetid gastropod *P. varians* were collected attached on floating marine debris that beached at Dois Rios (Figure 1).

The present work is the first record of a vermetid on floating marine debris and under rafting transportation along the Brazilian coast or elsewhere. Other gastropods, excepted vermetids, have been reported from a wide variety of items but they are most common in macroalgae, as facultative rafters (Thiel & Gutow, 2005).

Petalconchus varians distribution ranges from Florida (USA) to Santa Catarina (south of Brazil) (Rosenberg, 2009; Spotorno et al., 2012), and Ilha Grande is within its known distribution. Although *P. varians* is widely distributed in the West Atlantic coast, the species dispersal could be extended through antropogenic mechanisms. The occurrence of *Vermetus triquetus* Bivona, 1832 and *Thylaeodus rugulosus* Monterosato, 1878 in the Archipelago of the Azores (Portugal) is attributed to rafting over long distances from somewhere in the eastern Atlantic or Mediterranean as fouling attached to ships and vessels (Bieler, 1995). *Eualetes tulipa* (Rousseau in Chenu, 1843)

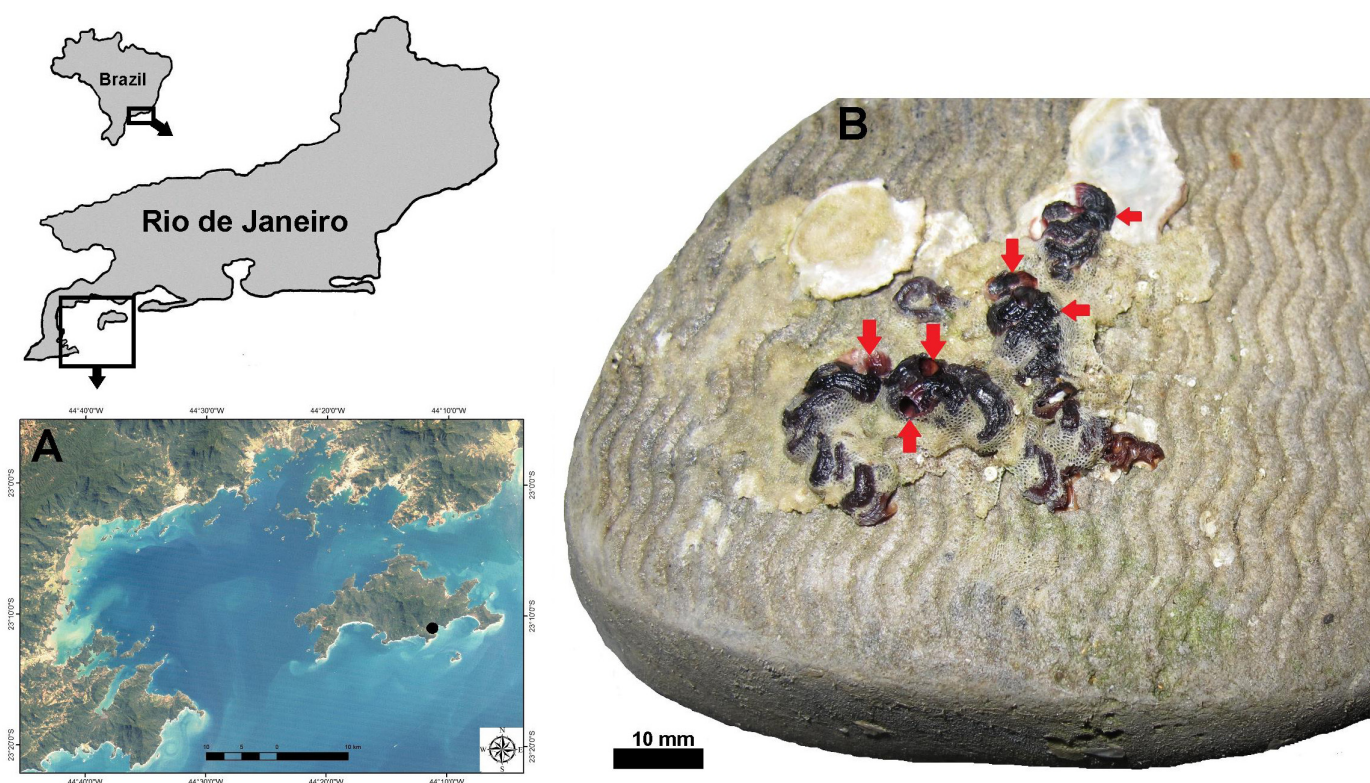


Figure 1. A) Photo of Ilha Grande and the local where marine debris was collected; B) Specimens of *Petalconchus varians* (red arrows) rafting on floating marine debris. Scale bar=1cm.

Figura 1. A) Foto da Ilha Grande e o ponto onde o lixo flutuante foi coletado b) Indivíduos de *Petalconchus varians* (seta vermelha) em lixo marinho flutuante. Barra de escala=1cm.

was introduced into the Hawaiian Islands (Coles et al., 2006), but its dispersal mechanism is not known.

In general, some vermetids are considered potential invasive species (Bieler 1995; Strathmann & Strathmann 2006) and are known for their high tolerance to adverse conditions such as poor availability of food, low water quality and varying environmental conditions (Schiaparelli & Cattaneo-Vietti, 1999; Strathmann & Strathmann, 2006), with a great ability to attach to different artificial substrates (Schiaparelli et al., 2003).

Vermetid are characterized by brooding egg capsules containing embryos, freely in the mantle cavity or attached to the shell close to mantle cavity (Miloslavich & Penchaszadeh, 1992). Fecundity was estimated as 1 up to 9 egg capsules on mantle cavity, each one containing up to 123/178 eggs. Larvae are released as late veliger, positively phototropic and settles in 24h (Miloslavich et al., 2007; Weinberger et al., 2010). According to Miloslavich et al. (2007), *Petalocochus* cf. *varians* from the Venezuela Caribbean region reproduces throughout the year which is important in order to maintain a viable population.

This reproductive behavior and effort could reflect upon dispersal by marine debris and the invasive potential of this species. If debris containing adults are transported to the shore, and find suitable habitats like rocky shores with many boulders or artificial jetties, larvae could settle in this new environment in the first step for species introduction. Vermetids are well adapted to sessile life and when attached on debris, they seem to survive.

Due to the increase of waste production by humans and growing amount of marine debris floating on the ocean, this process may be of increasing importance as a mechanism for species dispersal with the involuntary transportation of species (Farrapeira, 2011). As possible solutions to floating marine debris mitigation and involuntary rafting of organisms should be developed new research and technology like simulation programs to monitoring floating marine debris in the Atlantic coast and also create public local campaigns in countries such as Brazil in order to decrease the waste disposal at sea.

4. CONCLUSION

Petalocochus varians was the first time registered rafting along the Brazilian coast and this was the first occurrence of a vermetid species on floating marine debris.

Petalocochus varians can be dispersed on floating marine debris and is a potential invasive species into regions where it is not known to previously occur.

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