



Revista mexicana de biodiversidad

ISSN: 1870-3453

ISSN: 2007-8706

Instituto de Biología

Araya, Juan Francisco; Osorio, Cecilia  
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Revista mexicana de biodiversidad, vol. 90, 2019  
Instituto de Biología

DOI: 10.22201/ib.20078706e.2019.90.2510

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Taxonomy and systematics

## A new *Petricola* (Bivalvia: Veneridae) from central Chile, southeastern Pacific

### *Una nueva Petricola (Bivalvia: Veneridae) de Chile central, Pacífico sureste*

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Received: 23 October 2017; accepted: 27 August 2018

#### Abstract

A new subtidal bivalve species, *Petricola ramirezi* sp. n., is described from specimens collected from among cirripedian communities at Playa El Tabo (33°27' S, 71°38' W), central Chile. With a maximum recorded length of 16.3 mm, *Petricola ramirezi* is one of the smallest species in the genus found in the southeastern Pacific, and it is the fifth species from the subfamily Petricolinae recorded in Chile.

**Keywords:** Bivalvia; Boring mollusks; Petricolinae; Shallow water; New species

#### Resumen

Se describe un nuevo bivalvo submareal, *Petricola ramirezi* sp. n., de ejemplares recolectados entre comunidades de cirripedios en la playa El Tabo (33°27' S, 71°38' O), Chile central. Con una longitud máxima de 16.3 mm, *Petricola ramirezi* es una de las especies más pequeñas del género encontrada en el Pacífico sureste y es la quinta especie de la subfamilia Petricolinae registrada en Chile.

**Palabras clave:** Bivalvia; Moluscos perforadores; Petricolinae; Aguas someras; Especie nueva

#### Introduction

The genus *Petricola* Lamarck, 1801, encompasses 25 recent species from all over the world (Huber, 2010). These species live in crevices, or in holes made by

themselves by mechanical or chemical means, in rocks, or in hard surfaces such as corals, mollusk shells, and in communities of colonial polychaetes (Guzmán et al., 1998; Marincovich, 1973; Morton & Scott, 1988). Of the 14 *Petricola* species found in the Pacific Ocean, 4

of them are restricted to the northern Pacific Ocean and 7 reach the coasts of Ecuador and Peru in the southern Pacific, while *P. concinna* Sowerby I, 1834, has not been documented again since Deshayes (1853). Two species are restricted to Peru and Chile (*P. olssoni* Bernard, 1983 and *P. rugosa* Sowerby I, 1834), while *P. dactylus* is found in both the South Pacific and South Atlantic oceans (Aldea & Valdovinos, 2005; Valdovinos, 1999). In this study, part of ongoing studies documenting the biodiversity of bivalves in the Chilean coasts (Araya & Catalán 2016; Araya & Osorio, 2016), we report the discovery and description of a new *Petricola* species, based on shell characters and morphometry, from specimens collected from inside dead cirripedian shells in central Chile.

## Materials and methods

Ninety empty shells of the new species were extracted from inside communities of *Balanus laevis* Bruguière, 1789, washed ashore at Playa El Tabo (33°27' S, 71°38' W), Provincia de San Antonio, Región de Valparaíso, Chile, during July to September 2008. The morphological descriptions, valve length, valve height, valve width, and length of the posterior lamellar part of the ligament (as the distance from the beak to the end of the ligament groove) were measured with Vernier calipers ( $\pm 0.1$  mm) or by light microscopy. Position of the umbo was defined as the distance of the umbo from the anterior shell margin relative to the shell length. Abbreviations used in the text include; MNHNCL: Museo Nacional de Historia Natural, Santiago, Chile; MPCCL: Museo Paleontológico de Caldera, Caldera, Chile.

## Description

Superfamily Veneroidea Rafinesque, 1815

Family Veneridae Rafinesque, 1815

Subfamily Petricolinae d'Orbigny, 1840

Genus *Petricola* Lamarck, 1801, type species: *Venus lapicida* Gmelin, 1791

*Petricola ramirezi* new species (Fig. 1)

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**Diagnosis:** shell small (up to 16.3 mm), moderately stout, oval-ovate, sculptured with fine radial ribs on entire teleoconch. Escutcheon and lunule absent. Umbo situated in anterior first third of valve length. Beaks prosogyrate and slightly enrolled. Nymph wide solid. Fibrous layer of ligament occupying about a fourth of valve length. Pallial sinus deep, broadly rounded.

**Description of holotype:** shell small (maximum length up to 6.5 mm), white, oval in outline, equivalve. Outer surface sculptured with 100-120 regular and fine radial ribs which cover the entire surface of the teleoconch, this sculpture is crossed by faintly defined commarginal striae and by low lamellar ribs. Valves inequilateral, anterior end shortest, rounded; posterior end larger, slightly truncated, with a regularly rounded or slightly straight ventral margin (Fig. 1A, B, D, E). Umbones prosogyrate, convex and prominent (Fig. 1C). Escutcheon and lunule absent (Fig. 1F). Ligament elongated and deep, located posteriorly to the umbones. Interior of valves white, porcelainous; margins smooth (Fig. 1A, B). Pallial line visible, well impressed, pallial sinus deep, broad, rounded, forming a curve in the middle of the shell pointing posteriorly (Fig. 1I). Anterior adductor muscle scar oval, slightly elongate, impressed. Posterior adductor scar slightly shorter, subcircular or rounded; the posterior margin of both adductor muscle scars is slightly narrowed anteriorly. Hinge plate narrow; teeth relatively large, stout; right valve (Fig. 1G) with a subrectangular and vertical anterior cardinal and a bifid and large posterior cardinal; left valve (Fig. 1H) with a stout, large and bifid anterior cardinal, and a narrow, divergent, and subrectangular posterior cardinal. Soft parts unknown.

## Taxonomic summary

**Type material:** holotype: MNHNCL 100476, paratypes: MNHNCL 100477, MNHNCL 100478. All the material was collected at the type locality by C. Osorio, during July to September 2008.

**Type locality:** El Tabo (33°27' S, 71°38' W), Region of Valparaíso, central Chile.

**Distribution and habitat:** only known from type locality; the shells were found inside shells of the shallow water cirripedian *Balanus laevis* (Fig. 2), and inside shells of *Concholepas concholepas* (Bruguière, 1789) and *Trochita trochiformis* (Born, 1778).

**Etymology:** named in honor of the late Jaime Ramírez Böhme (Arica, Chile), for his extensive work on marine Chilean mollusks.

## Remarks

Adult and gerontic specimens of this new species are variable in outline and shape depending on nestling site. However, its diagnostic characteristics are constant in smaller or juvenile specimens; the radial sculpture is noticeable in even distorted or slightly eroded specimens. Due to this, a small adult specimen was selected as holotype, being more representative of the species.

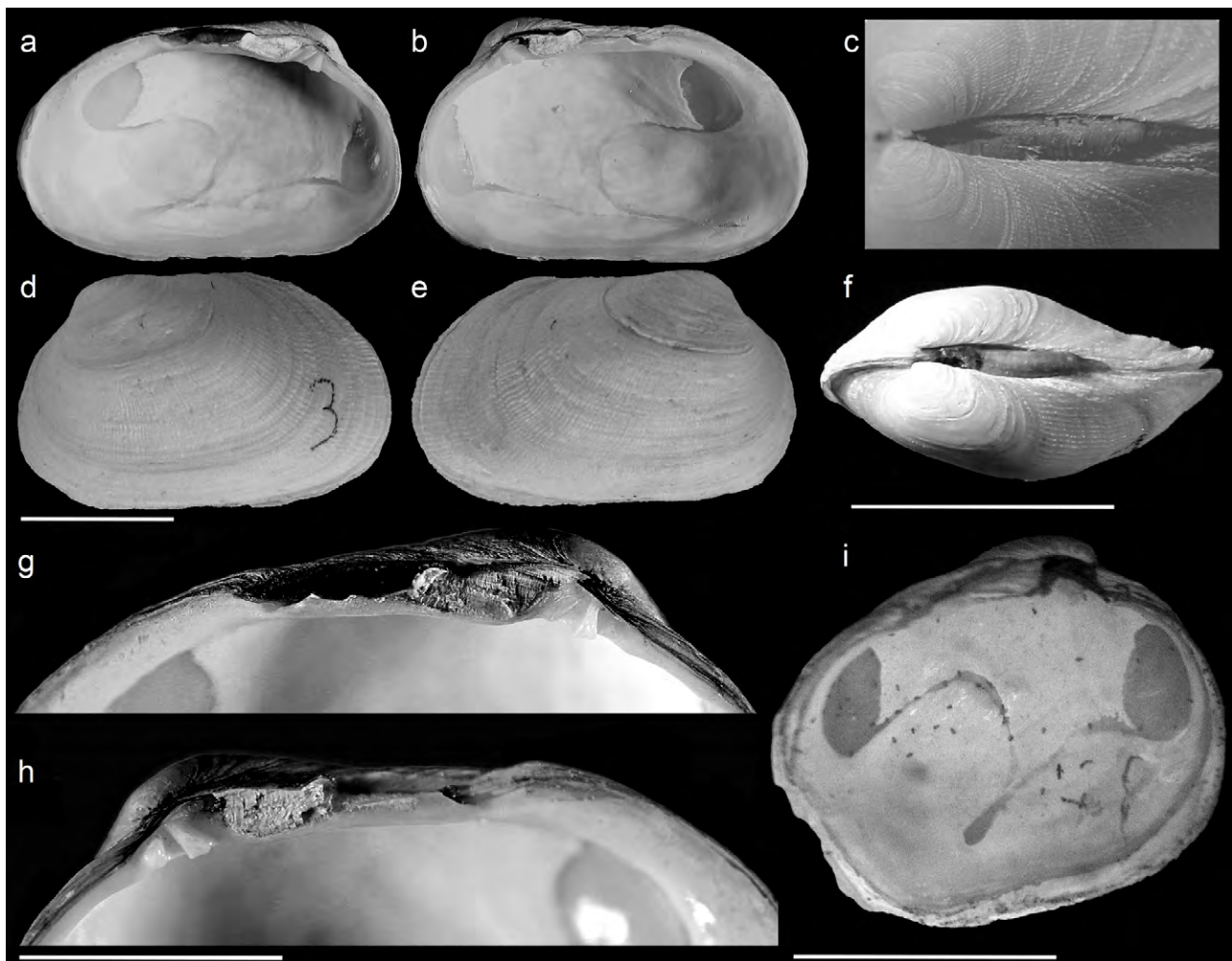


Figure 1. *Petricola ramirezi* n. sp., holotype MNHNCL 100476. a: internal view of left valve; b: internal view of right valve; c: detail of ligament; d: dorsal view of left valve; e: dorsal view of right valve; f: dorsal view of paratype MNHNCL 100477; g: detail of hinge of right valve of holotype; h: detail of hinge of left valve; i: internal view of left valve of paratype MNHNCL 100478, showing pallial line, sinus and adductor muscle scars. Scale bars, a, b, d, e: 10 mm; c, f-i: 5 mm.

## Discussion

The shell of *Petricola ramirezi* n. sp. is of a similar size to those of *P. concinna* and *P. olssoni*, and the morphology is closest to *Petricola carditoides* (Conrad, 1837), a species distributed from Alaska to Baja California (Coan & Valentich-Scott, 2012). However, the former of these 3 species can be differentiated from *P. ramirezi* n. sp. by the presence of a weaker escutcheon, a less impressed pallial sinus, and the lamellar conmmarginal sculpture, as well as the stronger and fewer radial ribs. The new species differs from *P. olssoni* by having a much smaller shell, with more radial ribs, a more impressed pallial sinus and a bright withish interior of the shell, different from the shell internally mottled with orange-brown in *P. olssoni*,

as reported by Coan (1997). Also, *P. ramirezi* n. sp. differs from *P. carditoides* in having less inflated valves, a deeper pallial sinus, and in having white juvenile shells (in contrast to *P. carditoides*'s juveniles which are mottled with brown color).

On the other hand, *Petricola dactylus* and *P. rugosa* differ from the new species by their much larger (up to 50 mm), more elongated (*P. dactylus*) and more inflated (*P. rugosa*) shells, sculptured with fewer and stronger radial ribs, often more evident at the anterior and posterior areas (Aldea & Valdovinos, 2005; Guzmán et al. 1998). Among the Eastern Pacific species, the only species like the new species herein described is *Petricola botula* Olsson, 1961, a species distributed from Mexico to Panama (Coan, 1997). However, *P. botula* has a more tumid and smaller



Figure 2. *Petricola ramirezi* n. sp. specimens in situ inside *Balanus laevis* colony. Scale bar: 10 mm.

shell, with a sculpture in which the ribs bifurcate in several places; its shell also has a pallial line not significantly bowed dorsally, in contrast with the pallial line in the new species. A species of similar size and habitat, *Petricola linguafelis* (Carpenter, 1857), also found in the eastern Pacific, from Baja California to Tumbes, Peru, differs from *P. ramirezi* n. sp. in its very distinctive beaded sculpture (Coan & Valentich-Scott, 2012).

The specialized habitat in different substrata promotes a high polymorphism of petricolid shells. They live and nest in narrow spaces, occupying empty orifices which limit their growth. *Petricola ramirezi* n. sp. has been found in empty cirripedian shells, and in shells of *Concholepas concholepas* (Brugière, 1789) and *Trochita trochiformis* (Born, 1778). This has also been observed for *Petricola denticulata* Sowerby I, 1834 and *P. linguafelis* (Carpenter, 1857), which live in shells and in harder substrata, like limestone. *Petricola dactylus* (Sowerby I, 1823), *P. exarata* (Carpenter, 1857), *P. rugosa* (Sowerby I, 1834), *P. californiensis* Pilsbry & Lowe, 1932 and *P. carditoides*

(Conrad, 1837) have also been observed living inside polychaetes and in teredinidae tubes (Coan, 1997).

### Acknowledgements

To Óscar Galvez (MNHNCL) and Gonzalo Collado, for their help with the photos of the new species, and to the two reviewers for their valuable suggestions and corrections on the manuscript.

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