

FIRST FOSSIL OCCURRENCE OF THE GENUS *PLATYCHELYNA* HAYWARD AND THORPE (BRYOZOA: CHEILOSTOMATA)

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FIRST FOSSIL OCCURRENCE OF THE GENUS *PLATYCHELYNA* HAYWARD AND THORPE (BRYOZOA: CHEILOSTOMATA)

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Palabras clave. Nueva especie. Smittinidae. Formación Monte León. Mioceno temprano. Argentina.

THE first contribution to the knowledge of the early Miocene Bryozoa of Argentina was a monograph published by Ferdinand Canu (1908). This author described the abundant material collected by Carlos Ameghino mainly from the Chenque Formation at Punta Borja, presently corresponding to Comodoro Rivadavia harbor and abrasion platform (see Bellosi, 1990; Paredes and Colombo, 2001; Cuitiño *et al.*, 2015; among others). Several articles on the bryozoan fauna of the Monte León Formation (Cabeza de León, early Miocene, Argentine Patagonia) have been published over the last years (Pérez *et al.*, 2015, 2018; Casadío *et al.*, 2010; López-Gappa *et al.*, 2017). The presence of species in common between the Chenque and Monte León formations suggests that the upper levels of the latter might correlate with the lower levels of the former (Pérez *et al.*, 2018).

The bryozoan collection assembled by the research vessel “Scotia” was described taxonomically almost eight decades after the Scottish National Antarctic Expedition 1902–1904 (Hayward, 1980). Station 346 in Burdwood Bank (54° 25' S; 57° 32' W, Fig. 1), at a depth of 102 m, included a small encrusting colony and several erect bilaminar fragments of an unknown cheilostome originally described as *Cellarinella planulata* Hayward, 1980. In a subsequent study (Hayward and Thorpe, 1990), Scanning Electron Microscope (SEM) images obtained from additional material collected by the research vessel “William Scoresby” on the

northwestern slope of this bank (depth range 368–463 m, Fig. 1), showed that *C. planulata* belonged in fact to the Smittinidae. The new genus *Platychelyna* Hayward and Thorpe, 1990 was erected for this species, which resulted in the new combination *Platychelyna planulata* (Hayward, 1980). The genus was introduced to accommodate smittinids with lyrula, without condyles or oral spines, and with one or two latero-oral adventitious avicularia on either or both of the corners of a prominent peristome developed as distal and proximal flaps. Further material of *P. planulata* collected by the research vessel “Polarstern” at a depth of 430 m near Cape Horn (Fig. 1) was listed by Moyano (1997, 2000). No other species of *Platychelyna* has been described after that.

The aim of this article is to describe the first fossil species of *Platychelyna* found in early Miocene rocks exposed in Santa Cruz Province, Argentina.

MATERIAL AND METHODS

The material described herein comes from the Punta Entrada Member of the Monte León Formation, which outcrops along the coastal cliffs of the Monte León National Park, Santa Cruz Province, Argentina (Fig. 1). This unit contains a species-rich, well-preserved megafauna (Pastorino and Griffin, 2018). At the locality known as Cabeza de León (50° 21.423' S; 68° 53.098' W)—from where the studied

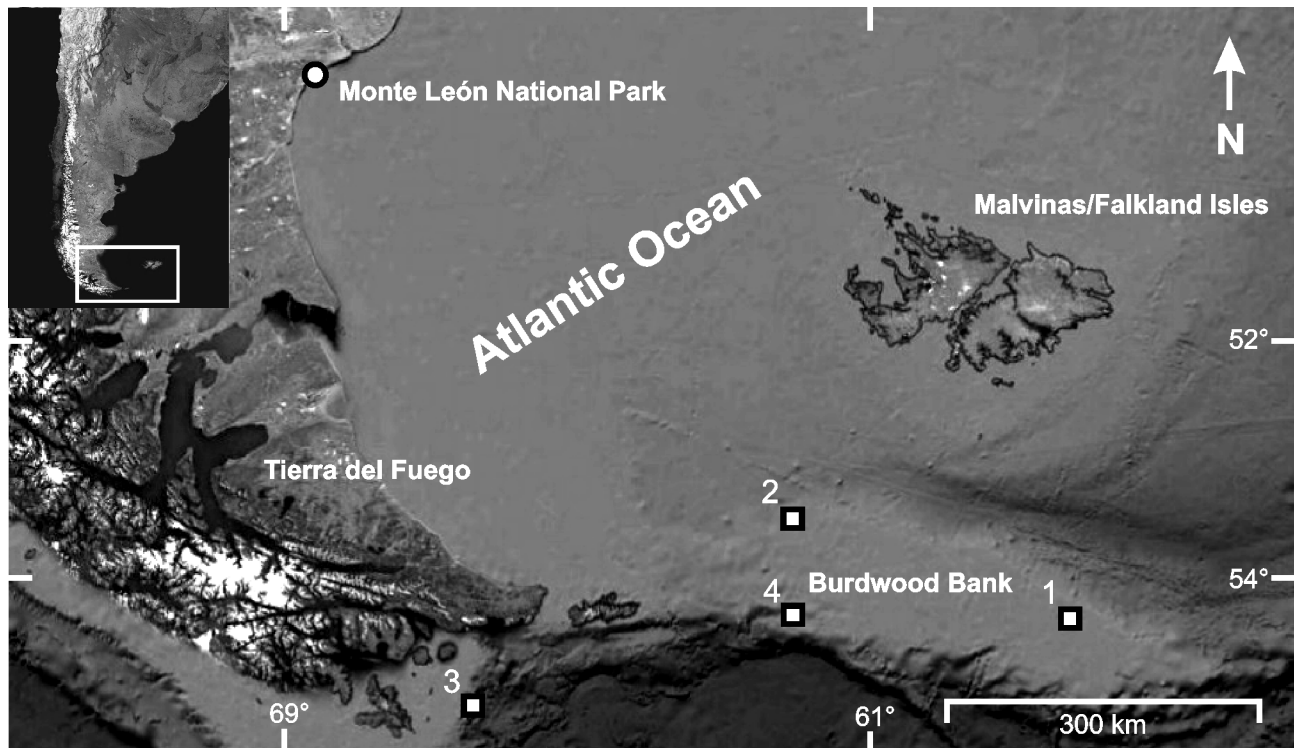


Figure 1. Distribution of the genus *Platychelyna*. Squares, *P. planulata*: 1, type locality, Scotia station 346 (Hayward, 1980). 2, William Scoresby station WS 840 (Hayward and Thorpe, 1990). 3, Polarstern station AGT-4 (Moyano, 1997, 2000). 4, Puerto Deseado station 43. Circle, *P. secunda* sp. nov. type locality. Image: modified from Google Earth® 2018, Image Landsat / Copernicus, Data SIO, NOAA, U.S. Navy, NGA, GEBCO.

material comes from—the section is ~47 m thick and mostly siliciclastic, consisting of bioturbated muddy siltstone and fine sandstone with abundant remains of fossil invertebrates (Parras *et al.*, 2012), including a rich association of bryozoans (see Pérez *et al.*, 2015, 2018; López-Gappa *et al.*, 2017). The lower part is mainly composed of siltstone and fine-grained sandstone, with trace fossils such as *Ophiomorpha* isp. Lundgren, 1891 and *Thalassinoides* isp. Ehrenberg, 1944. It also carries an abundant fauna of bivalves and decapods preserved in life position. Overlying these levels, there are some serpulids, corals and bryozoans. The middle part consists of ~11 m of bioturbated medium- to fine-grained sandstones, with bioclasts within the fine-grained levels. The fossil assemblage includes gastropods, bivalves and other invertebrates such as scaphopods, echinoderms, bryozoans, and barnacles. The upper part of the stratigraphic column includes ~19 m of siltstones, fine sandstone, tuff and heterolithic layers lacking fossils (Parras *et al.*, 2012).

Based on isotopic analyses of $^{87}\text{Sr}/^{86}\text{Sr}$, Parras *et al.*

(2012) assigned to the Monte León Formation the age of 22.12 Ma at the base and 17.91 Ma at the top, *i.e.*, consistently early Neogene (Aquitanian to early Burdigalian).

The recent specimen of *Platychelyna planulata* illustrated in Fig. 2 was collected in the Burdwood Bank on October 1978 by the fisheries vessel “Api IV” and is deposited in the collection of invertebrates at the Museo Argentino de Ciencias Naturales (MACN) with the number MACN-In No. 32359. Measurements of *P. planulata* were taken from an additional recent colony encrusting an octocoral from Station 43, Haul 328, Burdwood Bank 2017 campaign of the research vessel “Puerto Deseado” (54° 37.487' S; 61° 27.935' W, 398 m, MACN-In No. 41524, Fig. 1) using a micrometer eyepiece under a Zeiss stereomicroscope.

Both fossil and recent colonies were coated with gold/palladium and images were obtained using a SEM (Phillips XL-30) at the Museo Argentino de Ciencias Naturales. Fossil specimens are deposited in the collection of the División Paleozoología Invertebrados, Museo de La Plata (MLP).

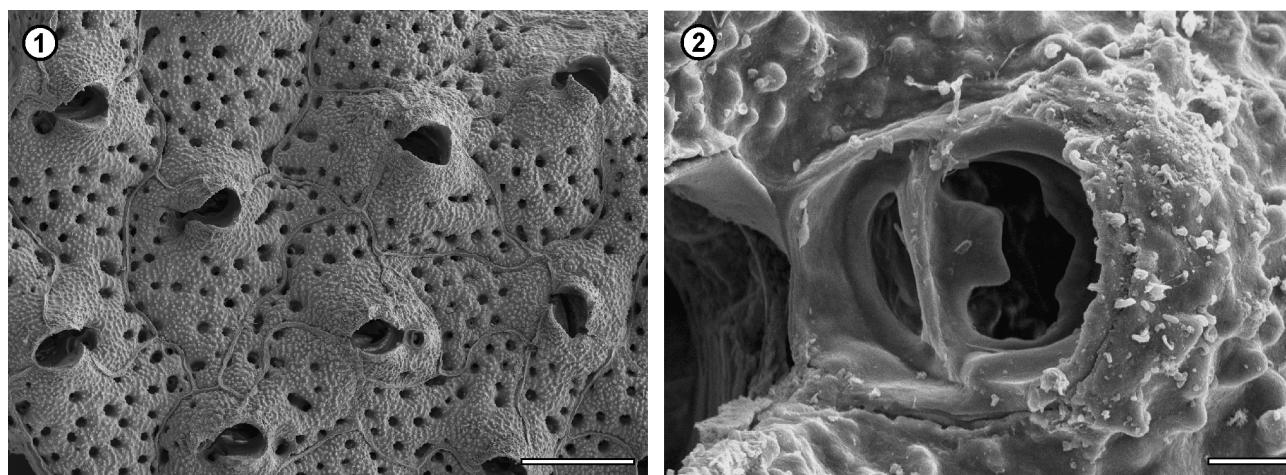


Figure 2. 1–2, *Platycheilyna planulata* (Hayward, 1980). 1, MACN-In No. 32359, several zooids and avicularia. Scale bar= 500 μ m. 2, MACN-In No. 41524, detail of avicularium showing transverse pivotal bar and ligula. Scale bar= 20 μ m.

SYSTEMATIC PALEONTOLOGY

Phylum BRYOZOA Ehrenberg, 1831

Class GYMNOLEAEMATA Allman, 1856

Order CHEILOSTOMATA Busk, 1852

Family SMITTINIDAE Levinsen, 1909

Genus *Platycheilyna* Hayward and Thorpe, 1990

Type species. *Cellarinella planulata* Hayward, 1980. Recent, Burdwood Bank.

Platycheilyna secunda sp. nov.

Figure 3

Derivation of name. From the Latin ‘*secundus – a – um*’, alluding to the fact that this is the second species of *Platycheilyna* to be described.

Type material. Holotype MLP 35820, colony fragment with around 41 zooids; paratype MLP 35821, two fragments with around 25 and 11 zooids, formerly belonging to a single colony.

Geographic and stratigraphic occurrence. Cabeza de León, a locality within Monte León National Park, Santa Cruz Province, in the Punta Entrada Member of the Monte León Formation (early Miocene).

Diagnosis. *Platycheilyna* with a smooth frontal shield pierced by around 46–80 rounded pores. Latero-oral avicularia with

serrated rostra, lacking a ligula in the transverse bar.

Description. Colony encrusting, unilaminar, multiserial (Fig. 3.1). Zooids robust, subhexagonal, well delimited by ridges (Fig. 3.2). Primary orifice with a broad and low anvil-shaped lyrula occupying most of the proximal border (Fig. 3.3). Condyles apparently absent. Peristome deep, asymmetric due to the inclusion of a proximo-laterally directed oral avicularium in either of the lateral corners (Fig. 3.2). No oral spines. Latero-oral avicularia sub-elliptical, 0.08 mm \times 0.06 mm, with a serrated rostrum (Fig. 3.4) and a complete transverse pivotal bar without ligula (Fig. 3.3), developing from pores adjacent to the proximo-lateral corners of the orifice. Frontal shield relatively smooth, pierced by around 46–80 rounded, large pseudopores (0.017–0.023 mm), which are absent near the proximal peristomial flap (Fig. 3.2). Sparse marginal areolae sub-elliptical, somewhat larger (0.033–0.043 mm) than the central pseudopores. Ovicells and ancestrula not seen.

Remarks. *Platycheilyna secunda* sp. nov. differs from *Platycheilyna planulata* (Fig. 2) in having zooids approximately 50% smaller (see Tab. 1). In addition, the peristome of *P. planulata* is much broader and shorter than in *P. secunda* sp. nov. Despite having smaller zooids, the number of pseudopores is greater in the frontal shield of *P. secunda* sp. nov. (on average 63) than on that of *P. planulata* (on average 37). The frontal shield of *P. secunda* sp. nov. is relatively smooth instead of granular as in *P. planulata*. The avicularium of *P.*

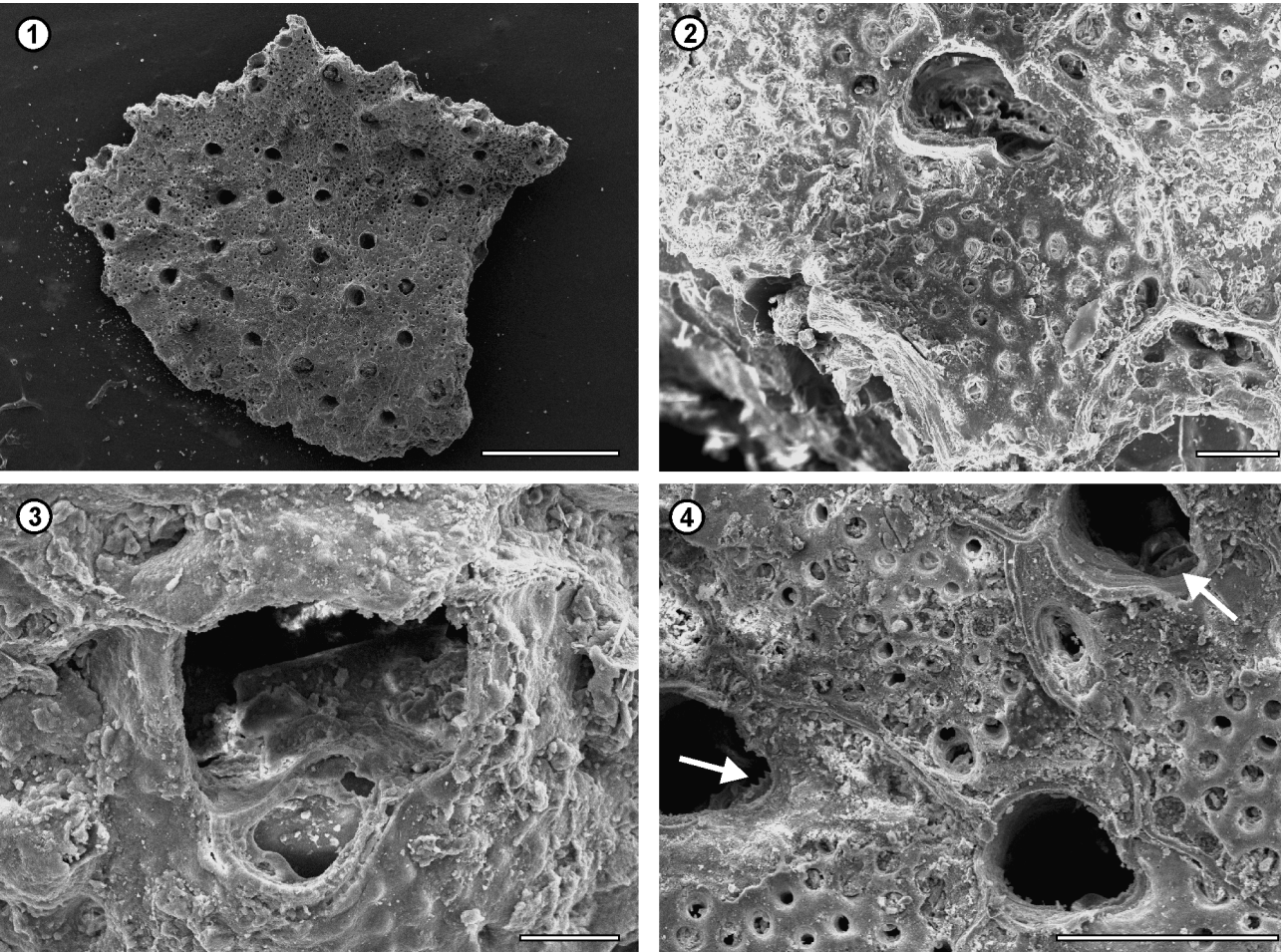


Figure 3. 1–4, *Platychelyna secunda* sp. nov., Cabeza de León (Santa Cruz, Argentina). 1, Holotype MLP 35820, overview. Scale bar= 1000 μ m. 2, Paratype MLP 35821, one zooid. Scale bar= 100 μ m. 3, Paratype, detail of aperture showing the lyrula and the avicularium. Scale bar= 50 μ m. 4, Holotype, arrows show the serrated rostra of two avicularia. Scale bar= 200 μ m.

TABLE 1 – Measurements (mm) of <i>Platychelyna secunda</i> sp. nov. (n=9) and <i>P. planulata</i> (Hayward, 1980) (N=10).				
	Zooid length	Zooid width	Peristome length	Peristome width
<i>Platychelyna secunda</i> sp. nov.				
Mean	0.71	0.40	0.13	0.16
Minimum	0.48	0.28	0.12	0.14
Maximum	0.87	0.54	0.16	0.20
<i>Platychelyna planulata</i> (Hayward, 1980)				
Mean	1.07	0.62	0.13	0.26
Minimum	0.95	0.52	0.12	0.24
Maximum	1.29	0.71	0.14	0.28

secunda sp. nov. has a serrated rostrum, and the transverse bar lacks a ligula, whereas in *P. planulata* the rostrum is not serrated, and the ligula is broad and well-developed (Fig. 2).

Both the holotype and the paratype of *P. secunda* are fragments of encrusting colonies, instead of being bilaminar erect as in *P. planulata*. In the material available of *P. secunda* sp. nov. we observed no more than a single oral avicularium per zooid and always embedded within the peristome.

DISCUSSION

Cheilostome bryozoans originated at the end of the Jurassic (Pohowsky, 1973), underwent a rapid diversification since the Upper Cretaceous and became the dominant group of marine bryozoans in recent seas (Taylor, 1988). As most of the recent genera and families originated in the early Cenozoic, it is not surprising to find fossil representatives of a genus that was previously only known from modern seas (Lagaaij, 1968; Gordon, 2000; Bock and Cook, 2002; Grischenko *et al.*, 2004). Similarly, a comparative analysis of fossil and recent faunas in regions with a rich Cenozoic record showed that families and genera already known as fossils were also found in the present-day fauna (Gordon, 1994).

The discovery of *P. secunda* sp. nov. extends the stratigraphic range of the genus *Platychelyna* back to the early Miocene (~20 Ma; Aquitanian to early Burdigalian). The distribution area of *Platychelyna* seems to have remained basically constant throughout the Neogene, *i.e.*, within the boundaries of the current Magellanic Biogeographic Province (López-Gappa and Lichtschein, 1988; López-Gappa, 2000).

As also observed in the Magellanic and southern hemisphere genus *Aspidostoma* Hincks (Pérez *et al.*, 2018), zooids of the living species of *Platychelyna* are much larger than those of the Miocene species. This might be related to the cooling of water masses that took place in the southwestern Atlantic since the opening of the Drake Passage towards the end of the Oligocene (Beu *et al.*, 1997; Lawver and Gahagan, 2003).

This study adds one more species to the bryozoan assemblage known for the Monte León Formation and shows that the biodiversity of the Patagonian bryozoan fauna

during the early Miocene was higher than expected from the original monograph by Ferdinand Canu (1908).

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