

New taxonomic position and neotype designation for the conoidean gastropod *Pleurotoma patagonica* d'Orbigny, 1841

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Abstract. *Pleurotoma patagonica* d'Orbigny, 1841 has been placed in several genera and families since its original description, perhaps because the type material, presumed lost, was never revised after the original description and because of the chaotic systematics of conoidean gastropods. New specimens, matching the original description and illustration and collected near the type locality allowed us to study the radula, shell, and protoconch. A neotype designation is proposed for this species in order to fix its identity. We tentatively assign it to the mangeliid genus *Bela* Leach, 1847, thus establishing *Bela patagonica* (d'Orbigny, 1841) comb. nov. Eleven species of *Bela* have been reported from Argentine waters; however, all of them have been reclassified into other genera and even other families. Despite the apparent geographic distance of *B. patagonica* comb. nov. from other species of this genus, this taxonomic placement of this species seems most appropriate and emphasizes shell characters until molecular data become available.

Key words. Argentina, Conoidea, Gastropoda, Mangeliidae, Molluscs.

DOI. <https://doi.org/10.1127/arch.moll/151/067-074>

Introduction

The superfamily Conoidea constitutes the most diverse group of carnivorous marine gastropods, inhabiting a large range of marine environments (KOHN 1998, ABDELKRIM et al. 2018). Recently, new deep-water collections from the Argentine continental slope have allowed for the review of the entire group in this part of the Southwestern Atlantic (PASTORINO & SÁNCHEZ 2016, SÁNCHEZ et al. 2018, SÁNCHEZ & PASTORINO 2020). Nevertheless, there are very few species living in shallow waters along the Argentine coast, as far as we know based on material available in collections. One such species, *Pleurotoma patagonica* d'Orbigny, 1841, was described from and illustrated by material that d'Orbigny collected from Bahía San Blas, in southern Buenos Aires province, and this new species was surprisingly grouped among muricids (D'ORBIGNY 1841 in 1834–1847). Judging by the material housed in local collections, it is an uncommon, small species less than 1 cm long. Since its description, the species has been included in the genera *Drillia* Gray, 1838 (TRYON 1884, CARCELLES 1950, CARCELLES & WILLIAMSON 1951, AGEITOS DE CASTELLANOS 1970, RIOS 1970, AGEITOS

DE CASTELLANOS & LANDONI 1993) or *Spirotropis* G.O. SARS, 1878 (RIOS 1985, 1994, 2009, SIMONE & MEZZALIRA 1994, FORCELLI 2000, FORCELLI & NAROSKY 2015). Despite the new arrangements of the former Turridae s.l. (BOUCHET et al. 2011, PUILANDRE et al. 2011), both *Drillia* and *Spirotropis* have always been considered to belong to the family Drilliidae. Perhaps the small original figure of *P. patagonica*, which shows no microscopic details, and a truly lengthy spire can explain its classification in Drilliidae, but variable generic allocation of Southwestern Atlantic conoidean species is a common problem.

Whole specimens collected near the type locality, several others in local collections, and a new radula preparation have allowed us to propose a different generic and familial position for *P. patagonica*.

Materials and Methods

A total of 194 specimens (36 with soft parts) of *Bela patagonica* comb. nov. were examined. The material studied belongs to the invertebrate collections of Museo Argentino de Ciencias Naturales “Bernardino

Rivadavia” (MACN, Buenos Aires, Argentina), Museo Nacional de Historia Natural (MNHN, Montevideo, Uruguay), and Fundación Azara (CFA, Buenos Aires). One specimen, selected as the neotype, was collected alive at Las Grutas, San Antonio Oeste, Río Negro province, Argentina. Museum numbers and specimen localities are shown in Table 1. Shells were measured using digital Vernier callipers to the nearest 0.1 mm. Protoconch whorls were counted according to BOUCHET & KANTOR (2004). Shells were photographed using a Zeiss Stereo Discovery V20 Modular Microscope and a Philips XL30 Scanning Electron Microscope (SEM), both at the MACN. The radula was obtained from a preserved specimen (MACN-In43126), cleaned with commercial bleach diluted with 1–3 parts of distilled water following KANTOR & PULLANDRE (2012), mounted on glass coverslips and air-dried, coated with gold-palladium, and photographed under SEM. All images were digitally processed with Adobe Photoshop.

The abbreviations “sp” and “sh” are used for whole specimens and empty shells, respectively

Systematics

Superfamily Conoidea

Family Mangeliidae

We follow the family diagnosis by BOUCHET et al. (2011). According to these authors, the higher spire as seen in *Bela patagonica* is unusual for the family.

Genus *Bela* Leach in Gray, 1847

Type species. *Murex nebula* Montagu, 1803, type by subsequent designation of GRAY (1847). SCARPONI et al. (2014) noted the diagnostic shell characters of *Bela*, which clearly match those of *B. patagonica* comb. nov. (see Discussion).

Bela patagonica (d’Orbigny, 1841) comb. nov.

Figures 1, 2

Pleurotoma patagonica D’ORBIGNY 1841 in 1834–1847: 446, pl. 77 figs 15, 16—GRAY 1855: 43; PAETEL 1888: 68; STREBEL 1905: 579, pl. 23 fig. 46a–c; TUCKER 2004: 737.

Drillia patagonica—TRYON 1884: 208, pl. 13 fig. 47; IHERING 1907: 448; CARCELLES 1950: 65, pl. 3 fig. 46; CARCELLES & WILLIAMSON 1951: 305; AGEITOS DE CASTELLANOS 1970: 133, pl. 10 fig. 13; RIOS 1970: 126 [pl. 48 fig. is another species]; AGEITOS DE CASTELLANOS & LANDONI 1993: 10, pl. 3 fig. 30a, b.

Spirotropis patagonica—RIOS 1985: 138, pl. 47 fig. 634; 1994: 162, pl. 53 fig. 725; 2009: 312, fig. 791; FORCELLI 2000: 107, fig. 313; FORCELLI & NAROSKY 2015: 90, fig. 243.

Spirotropis patagonicus—SIMONE & MEZZALIRA 1994: 45, pl. 13 fig. 369.

Type material. The type material is assumed lost. Most of d’Orbigny’s South American collection is housed at

the Natural History Museum, London (NHMUK). However, in GRAY’s (1855) catalogue of the material received by the British Museum from d’Orbigny, the only mention of this species (GRAY 1855: 43) listed it without the “B.M.” mark, meaning that this species was not present in the material purchased by the museum. The type is not present in the collections of NHMUK (A. Salvador pers. comm.). There is also apparently no type material housed in the Museum national d’Histoire naturelle (MNHN) Paris where some material of d’Orbigny was also deposited (V. Heros pers. comm.).

MARTENS (1880) described and illustrated a specimen (shell length 23 mm) that he attributed erroneously to *Pleurotoma (Drillia) patagonica* d’Orbigny; he later considered this a variety, which he named *Pleurotoma patagonica* var. *magellanica* E. von Martens, 1881. STREBEL (1905: 585, pl. 23 fig. 45) pointed out that MARTENS’S (1880: 36, pl. 8, fig. 3a, c) illustration of *P. (D.) patagonica* was not d’Orbigny’s species and described *?Bela gazellae* based on the name from an unpublished manuscript by Martens.

In addition, STREBEL (1905: 586, pl. 23 fig. 48a, c) redescribed and provided the first illustration of *P. patagonica* var. *magellanica* (of a 7.3 mm long specimen) and assigned it to *?Bela*.

Bela gazellae and *Pleurotoma patagonica* were later recognized by IHERING (1907: 448, 218) as species of *Daphnella* and *Drillia*, respectively.

Given that the type material of *P. patagonica* is missing and that there is a possibility of confusion with *?B. gazellae* and *?B. magellanica*, a neotype designation seems necessary. A whole specimen collected from Las Grutas, Río Negro province about 100 km from the type locality area is designated here as the neotype of *Pleurotoma patagonica* in order to fix the taxonomic status of the species pursuant to the International Code of Zoological Nomenclature (ICZN 1999) Article 75.3. This neotype, illustrated in Figure 1C, is deposited in the MACN under the number MACN-In43983.

Type locality. Restricted here to 40° 49.14’ S, 065° 04.68’ W, Las Grutas, Río Negro, Argentina; depth to 8 m.

Materials examined. See Table 1.

Description. Shell (Figs 1, 2A) small (length to 11.2 mm), yellowish, of c. 9 convex whorls; spire long, more than ½ of shell length; protoconch (Fig. 2B, C) globose, of ¾ whorls; first 1½ whorl smooth, second and third whorls with slightly curved axial cords crossed by spiral threads, forming nodes at their intersection; teleoconch of 6 whorls; all whorls with micropustules, clearly seen at protoconch–teleoconch transition (Fig. 2D). Axial ornamentation of rounded ribs, covering whole whorl but stronger below middle of subsutural ramp, 13 on first whorl, 12 or 13 on second, and 13 or 14 on third, increasing in number to 16 on last whorl. Spiral ornamentation of thick cords interleaved with narrower threads throughout shell. Siphonal canal short. Callus very thin.

Table 1. List of examined samples of *Bela patagonica* (d'Orbigny, 1841) comb. nov. All localities are in Argentina unless specified. sh = empty shell; sp = whole specimen.

Collection no.	Locality	Depth (m)	No. of specimens
MACN-In31870	La Paloma, Uruguay	—	2 sh
MNHN15130	Playa del Puerto, La Paloma, Uruguay	—	1 sp
MACN-In30133	36°00'S, 054°00'W, off Bahía Samborombón	c. 30	1 sh
MACN-In16451	Off Punta Médanos, Buenos Aires	—	1 sh
MACN-In30850	Puerto Ingeniero White, Bahía Blanca, Buenos Aires	6	2 sh
MACN-In11340	Base Naval Puerto Belgrano, Buenos Aires	—	3 sh
MACN-In11215	Arroyo Parejas, Buenos Aires	—	7 sh
CFA-IN-1135	Arroyo Parejas, Punta Alta, Buenos Aires	—	2 sh
CFA-IN-2773	Arroyo Parejas, Punta Alta, Buenos Aires	—	3 sh
MACN-In20277	Bahía San Blas, Buenos Aires	—	2 sh
MACN-In9152-12	Puerto San Antonio, Río Negro	—	4 sh
MACN-In43983	40°49.1'S, 065°04.7'W, Las Grutas, Río Negro	8	1 sp
MACN-In28797	Punta Delgado, San Antonio Oeste, Río Negro	—	6 sh
MACN-In43127	40°46'18.2"S, 065°02'07.6"W, between San Antonio Oeste and Las Grutas, Río Negro	0	3 sh
MACN-In43108	40°48'35.2"S, 065°05'44.7"W, Las Grutas, Río Negro	6	1 sp, 6 sh
MACN-In43109	40°48'47.4"S, 065°05'01.2"W, Las Grutas, Río Negro	8	1 sp, 4 sh
MACN-In43105	40°48'47.4"S, 065°05'14.1"W, Las Grutas, Río Negro	8	2 sh
MACN-In43120	40°49'01.5"S, 065°04'39.2"W, Las Grutas, Río Negro	5	3 sp, 2 sh
MACN-In43115	40°49'13.1"S, 065°05'17.3"W, Las Grutas, Río Negro	9	1 sh
MACN-In43118	40°49'16.2"S, 065°05'29.6"W, Las Grutas, Río Negro	10	1 sp, 2 sh
MACN-In43124	40°49'27.7"S, 065°04'16.0"W, Las Grutas, Río Negro	15	28 sh
MACN-In43111	40°49'44"S, 065°05'13.5"W, Las Grutas, Río Negro	9	1 sh
MACN-In43116	40°49'56.6"S, 065°05'16.2"W, Las Grutas, Río Negro	7	1 sp, 1 sh
MACN-In43107	40°50'12.8"S, 065°04'42.2"W, Las Grutas, Río Negro	10	2 sp, 13 sh
MACN-In43119	40°50'23"S, 065°04'03"W, Las Grutas, Río Negro	10	5 sh
MACN-In43101	40°50'35.5"S, 065°04'43.7"W, Las Grutas, Río Negro	12	5 sh
MACN-In43104	40°50'26.0"S, 065°05'07.1"W, Las Grutas, Río Negro	6	1 sp
MACN-In43984	Sta. 12, 40°53'00.8"S, 065°04'33.7"W, San Antonio Oeste, Río Negro	17	1 sh
MACN-In43985	Sta. 5, 40°53'08.6"S, 065°04'05.3"W, San Antonio Oeste, Río Negro	18	3 sh
MACN-In43986	Sta. 6, 40°54'13.5"S, 065°05'00.7"W, San Antonio Oeste, Río Negro	15	1 sp, 2 sh
MACN-In43122	40°54'08.3"S, 065°06'28.0"W, Las Grutas, Río Negro	9	21 sh
MACN-In43126	40°54'24.2"S, 065°08'56.3"W, Las Grutas, Río Negro	5	20 sp, 1 sh
MACN-In43112	40°55'00.00"S, 065°01'55.08"W, Las Grutas, Río Negro	9	1 sp
MACN-In43114	40°55'12.48"S, 065°03'58.98"W, Las Grutas, Río Negro	18	1 sp, 5 sh
MACN-In43113	40°55'17.4"S, 065°08'07.6"W, Las Grutas, Río Negro	7–8	1 sh
MACN-In43125	40°55'41.4"S, 065°08'36.2"W, Las Grutas, Río Negro	5	6 sh
MACN-In43102	40°56'27.2"S, 065°07'58.2"W, Las Grutas, Río Negro	10–11	3 sh
MACN-In21316-1	Golfo San Matías	—	1 sh
MACN-In43103	41°30'44.3"S, 064°59'00.7"W, Playas Doradas, Chubut	15	1 sh
MACN-In43123	41°33'03.7"S, 064°59'28.2"W, Playas Doradas, Chubut	11	1 sh
MACN-In43106	41°37'32.9"S, 064°59'38.3"W, Playas Doradas, Chubut	20	2 sh
MACN-In43117	41°40'48.3"S, 065°00'46.1"W, Playas Doradas, Chubut	12	1 sh
MACN-In43110	41°40'49.1"S, 065°00'46.0"W, Playas Doradas, Chubut	12	3 sh
MACN-In43121	42°00'54.2"S, 065°03'40.9"W, Puerto Lobos, Chubut	10–12	1 sp

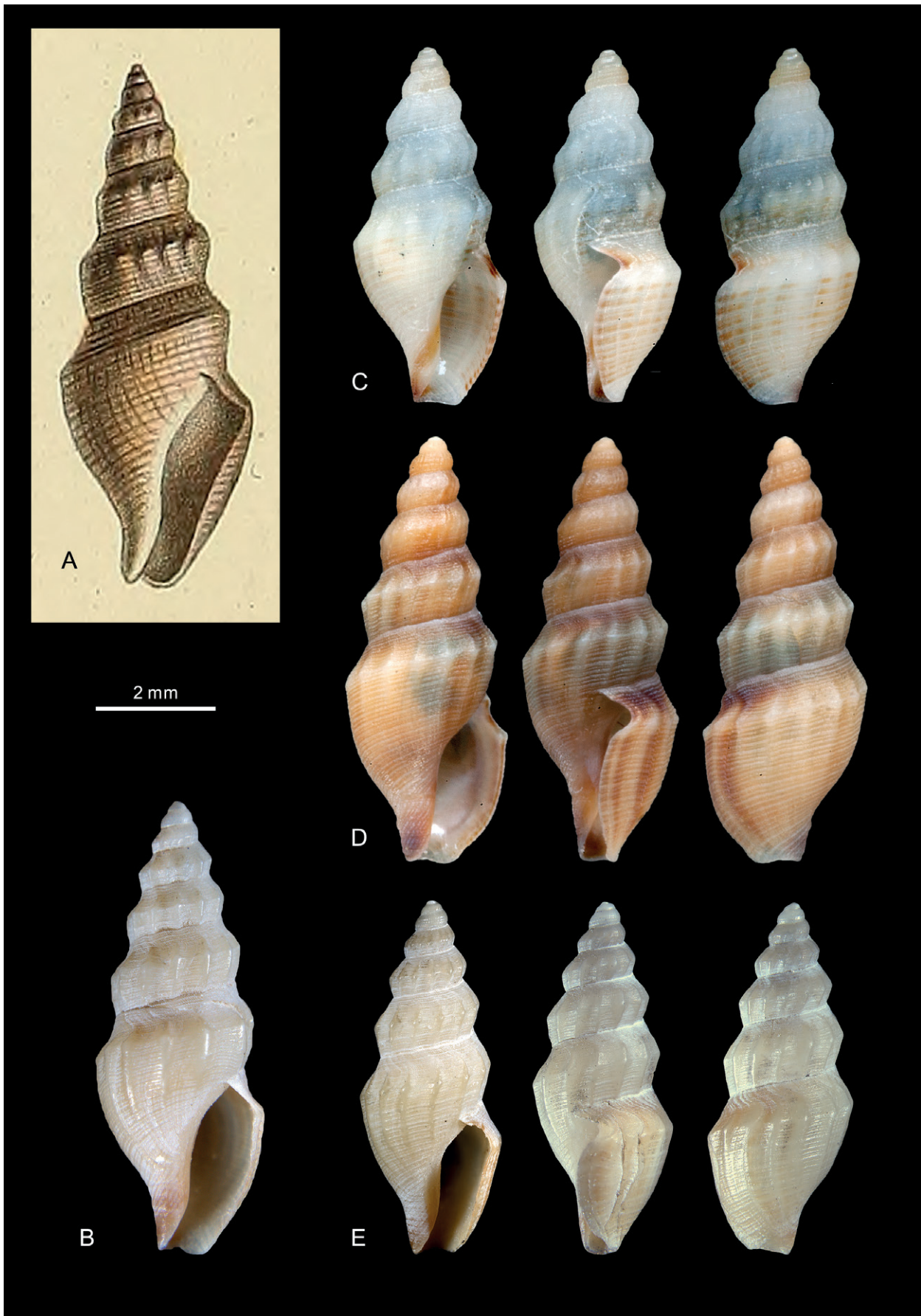


Figure 1. *Bela patagonica* (d'Orbigny, 1841). **A.** Original illustration from d'ORBIGNY (1841: pl. 77 fig. 15, rotated 180°). **B.** From off Bahía Blanca, Buenos Aires province, Argentina, MACN-In30850. **C.** Neotype, from 40° 49.14' S, 065° 04.68' W, Las Grutas, Río Negro, Argentina, at 8 m depth, MACN-In43983. **D.** From 40° 54' 24.2" S, 065° 08' 56.0" W, at 5 m depth, MACN-In43116. **E.** From off Bahía Blanca, Buenos Aires province, Argentina, MACN-In30850.

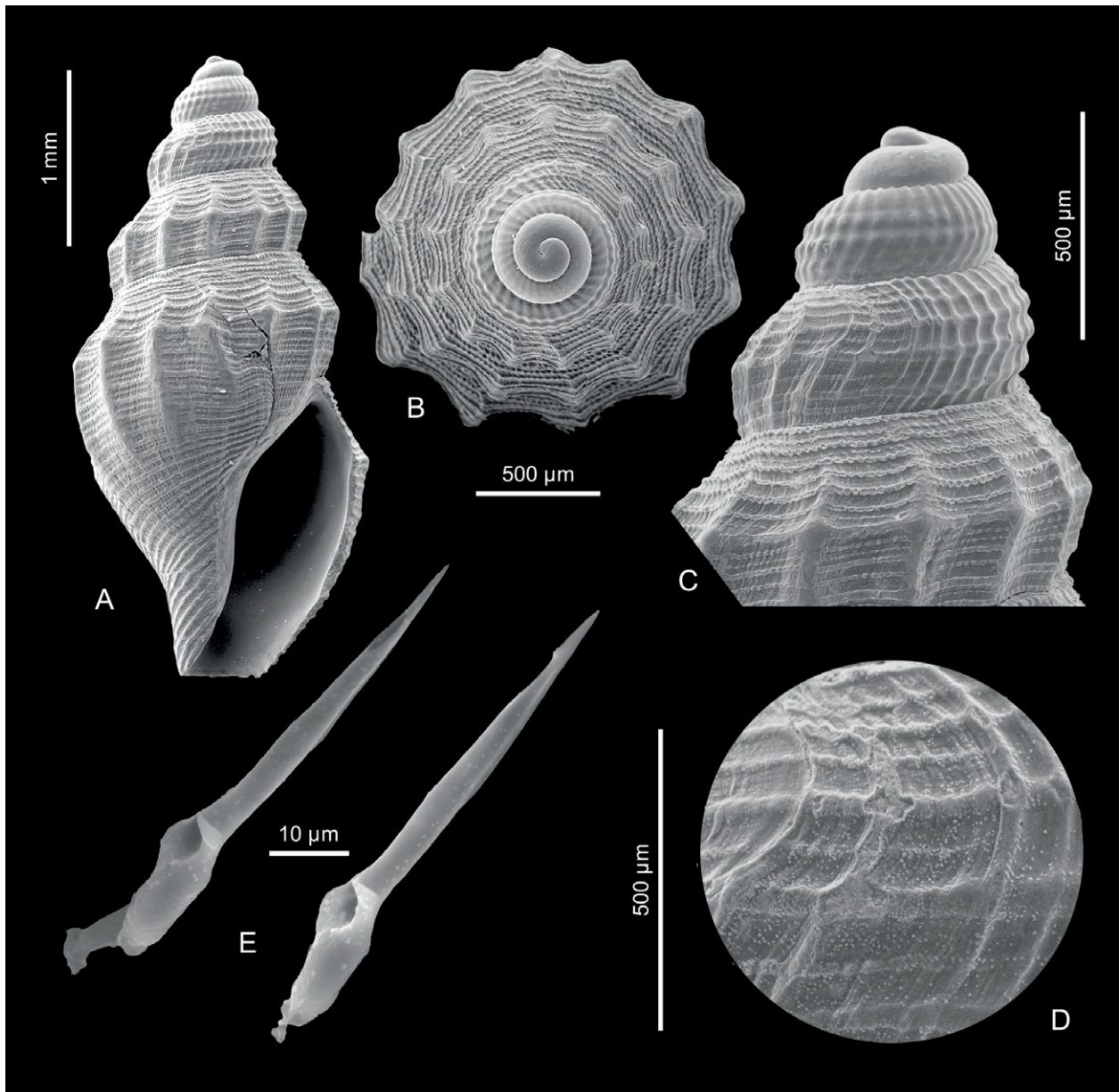


Figure 2. *Bela patagonica* (d'Orbigny, 1841) **A–D.** SEM photographs, from Sta. 12, 40°53'00.7"S, 065°04'33"W, San Antonio Oeste, Río Negro, Argentina, at 17 m depth, MACN-In43984: **(A)** apertural view; **(B)** apical view of the protoconch; **(C)** lateral view of the protoconch; **(D)** detail showing micropustules at protoconch–teleoconch transition. **E.** From 40°54'24.2"S, 065°08'56"W, 5 m depth, MACN-In43126, detail of the teeth.

Aperture elongate-oval. Anal sinus shallow on sub-sutural ramp. Outer lip thin. Operculum absent. Eyes on peduncle tip; peduncles short (c. 0.38 mm in animal with shell of 5.3 mm long). Radula (Fig. 2E) of marginal teeth; tooth 63.5 µm long, with base elongate; basal spur and ligament present.

Distribution. RIOS (1970, 1985, 1994, 2009) recorded this species from Rio Grande do Sul, Brazil, to Golfo San Jorge, Argentina, in 87–119 m. LAYERLE & SCARABINO (1984) recorded it from the Uruguayan inner shelf at a depth of 15 m. According to the material we have seen, *B. patagonica* occurs from La Paloma, Uruguay, to Puerto Lobos, Chubut, Argentina at depths less than 30 m.

Stratigraphic range. Miocene–Holocene. AGUIRRE (1990,

1991, 1993) cited specimens from Quaternary deposits from northeastern Buenos Aires province, Argentina, and SIMONE & MEZZALIRA (1994) from the Miocene to Holocene in the Pelotas Basin, Brazil.

Discussion

The family Mangeliidae includes 62 living and 6 fossil genera according to WoRMS (2022). For decades it was thought to be a subfamily of Turridae (POWELL 1966, MCLEAN 1971, TAYLOR et al. 1993, PUILANDRE et al. 2008, among others), but BOUCHET et al. (2011) raised Mangeliinae to the family level based on the molecular

phylogeny proposed by PUILANDRE et al. (2011).

One of the most controversial genera of Mangeliidae is probably *Bela*, which was poorly characterized by Leach (in GRAY 1847) and apparently currently includes many unrelated species and subgeneric groups (SCARPONI et al. 2014). Despite this, the morphology of protoconch and shell of *Bela patagonica* comb. nov. supports the allocation of this species to *Bela*. SCARPONI et al. (2014) redescribed the genus *Bela* and highlighted the main conchological differences between *Bela* and *Mangelia* Risso, 1826, comparing the type species of both genera, *B. nebula* (Montagu, 1803) and *M. striolata* Risso, 1826: the outer lip is thin in *Bela* but thickened by a varix in *Mangelia*; the anal sinus is shallow, v-shaped, and placed on the subsutural ramp in *Bela* but well developed, C-shaped, and subsutural in *Mangelia*; axial sculpture consists of broad, rounded ribs, usually wider than their interspaces in *Bela* but sharp, narrow, smaller than their interspaces, slightly sinuous, and with their maximum curvature in their upper part in *Mangelia*.

The genus *Bela* is distributed off Great Britain, northern Norway, France, Portugal, and in the Mediterranean Sea (SCARPONI et al. 2014, BOGI et al. 2021). *Mangelia*

occurs in the Mediterranean Sea and with some species known from the Atlantic coasts of Africa and northern Europe (SPADA & DELLA BELLA 2010).

The genus *Bela* has been reported from Argentine waters by several authors. STREBEL (1905, 1908) described 11 species in this genus, some of them with hesitation. However, all of these species have since been reallocated to other genera or even families (Table 2). This is not surprising as the currently recognised species of *Bela* are distributed in the north-eastern Atlantic and the Mediterranean Sea. However, most of the distinctive shell features of *Bela nebula*, the type species of *Bela*, are also evident in *B. patagonica*, suggesting this generic position.

Thus, our study places *B. patagonica* in the family Mangeliidae. Shell and radular characters undoubtedly point to this family and certainly not to Drilliidae. However, the assignment to genus is still somewhat dubious; although *B. patagonica* fits the established diagnosis of *Bela*, this genus clearly requires extensive revision. The radular features of *B. patagonica*, illustrated with SEM here for the first time, differ from those figured by POWELL (1966: fig. 127) and TAYLOR et al. (1993: fig. 25D)

Table 2. Species from Argentine waters described by STREBEL (1905, 1908) in the genus *Bela* and their changed generic placements by other authors.

Current family	Original species name	Alternative generic placements	Current accepted placement (fide WoRMS 2022)
Mangeliidae	<i>Bela lateplicata</i> Strebel, 1905	<i>Mangelia (Bela)</i> : CARCELLES 1950 <i>?Propebela</i> : AGEITOS DE CASTELLANOS & LANDONI 1993; LINSE 1999 <i>Oenopota</i> : FORCELLI 2000; FIGUEIRA & ABSALÃO 2010	<i>Propebela lateplicata</i> (Strebel, 1905): FORCELLI & NAROSKY 2015
	<i>?Bela gazellae</i> Strebel, 1905	<i>Mangelia (Bela)</i> : CARCELLES 1950; CARCELLES & WILLIAMSON 1951 <i>Mangilia</i> [sic]: AGEITOS DE CASTELLANOS 1970	<i>Mangelia gazellae</i> (Strebel, 1905): AGEITOS DE CASTELLANOS & LANDONI 1993; FORCELLI 2000; FORCELLI & NAROSKY 2015
	<i>?Bela martensi</i> Strebel, 1905	<i>Mangelia (Bela)</i> : CARCELLES 1950; CARCELLES & WILLIAMSON 1951 <i>Mangilia</i> [sic]: AGEITOS DE CASTELLANOS 1970	<i>Mangelia martensi</i> (Strebel, 1905): AGEITOS DE CASTELLANOS & LANDONI 1993; FORCELLI 2000; FORCELLI & NAROSKY 2015
	<i>?Bela michaelseni</i> Strebel, 1905	<i>Mangelia (Bela)</i> : CARCELLES 1950; CARCELLES & WILLIAMSON 1951 <i>Mangilia</i> [sic]: AGEITOS DE CASTELLANOS 1970	<i>Mangelia michaelseni</i> (Strebel, 1905): AGEITOS DE CASTELLANOS & LANDONI 1986; AGEITOS DE CASTELLANOS & LANDONI 1993; (= <i>M. andersoni</i> [sic]) FORCELLI 2000; FORCELLI & NAROSKY 2015; DI LUCA & ZELAYA 2019
	<i>?Bela paessleri</i> Strebel, 1905	<i>Mangelia (Bela)</i> : CARCELLES 1950; CARCELLES & WILLIAMSON 1951	<i>Mangelia paessleri</i> (Strebel, 1905): AGEITOS DE CASTELLANOS & LANDONI 1993; FORCELLI 2000
	<i>Bela pelseneeri</i> Strebel, 1908	<i>Oenopota</i> : ENGL 2012	<i>Lorabela pelseneeri</i> (Strebel, 1905): POWELL 1951; HAIN 1990; AGEITOS DE CASTELLANOS & LANDONI 1993; KANTOR et al. 2016
Borsoniidae	<i>Bela angusteplicata</i> Strebel, 1905	<i>Mangelia (Bela)</i> : CARCELLES 1950; CARCELLES & WILLIAMSON 1951 <i>Leucosyrinx</i> : AGEITOS DE CASTELLANOS & LANDONI 1993; FORCELLI 2000; DI LUCA & ZELAYA 2019	<i>Antarctospira angusteplicata</i> (Strebel, 1905)
	<i>Bela purissima</i> Strebel, 1908	<i>Mangelia</i> : CARCELLES 1944 <i>Mangelia (Bela)</i> : CARCELLES 1950 <i>Typhlodaphne</i> : POWELL 1951; CARCELLES & WILLIAMSON 1951 <i>Mangilia</i> [sic]: AGEITOS DE CASTELLANOS 1970	<i>Typhlodaphne purissima</i> (Strebel, 1908): AGEITOS DE CASTELLANOS & LANDONI 1993; FORCELLI 2000; FORCELLI & NAROSKY 2015; ZELAYA 2005; KANTOR et al. 2016
Prosiphonidae	<i>Bela anderssoni</i> Strebel, 1908	<i>Mangelia (Bela)</i> : CARCELLES & WILLIAMSON 1951 <i>Bela</i> : ENGL 2012	<i>Falsimohnia anderssoni</i> (Strebel, 1908): KANTOR & HARASEWYCH 2013
	<i>Bela fulvicans</i> Strebel, 1908	<i>Mangelia (Bela)</i> : CARCELLES 1950; CARCELLES & WILLIAMSON 1951 <i>Bela</i> : ENGL 2012	<i>Falsimohnia fulvicans</i> (Strebel, 1908): KANTOR & HARASEWYCH 2013
	<i>Bela notophila</i> Strebel, 1908	<i>Lorabela</i> : POWELL 1951; AGEITOS DE CASTELLANOS & LANDONI 1993; ZELAYA 2005 <i>Bela</i> : ENGL 2012	<i>Strebelia notophila</i> (Strebel, 1908): KANTOR & HARASEWYCH 2013

for *B. nebula*. In *B. nebula* the marginal teeth are short, broad, flat, and simple-pointed, rising obliquely from a straight base, while in *B. patagonica* the marginal teeth have an elongate base, with a basal spur and ligament present. Despite this and a distribution far to the south of other species of the genus, the taxonomic placement of *B. patagonica* in *Bela* seems the most appropriate until molecular data become available and a more extensive revision can be made.

Acknowledgements

We are grateful to A. Salvador (NHMUK), V. Héros (MNHN), A. Tablado (MACN), F. Scarabino (MNHN), and S. Bogan (CFA-UMAI), who kindly gave access or sent material from malacological collections under their care. We especially thank I. Chiesa (CADIC) for providing some materials examined and N. Cetra (UNCOMA) for hand-collecting hard-to-find specimens and shooting the video. F. Tricárico (MACN) assisted with the operation of the SEM. Three reviewers and the editor Julia Sigwart kindly helped to improve the original manuscript.

This work was supported by PICT 2016-1309 and PICT 2016-0211 from Agencia Nacional de Promoción Científica y Tecnológica. We acknowledge funding by the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET) of Argentina, to which GP belongs as member of the Carrera del Investigador Científico and NS is a fellow.

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Manuscript submitted 12 November 2020
Revised manuscript accepted 22 May 2022

Supplemental Material

Video file. Neotype specimen (MACN-In43983) collected alive at Las Grutas, San Antonio Oeste, Río Negro Province, Argentina, 8 m depth. <https://doi.org/10.5281/zenodo.6576659>