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# No longer monotypic: new species of the buccinoidean genera *Germonea* and *Drepanodontus* in the southwestern Atlantic (Gastropoda: Buccinidae)

Guido Pastorino

Museo Argentino de Ciencias Naturales "Bernardino Rivadavia"
Av. Angel Gallardo 470 3° piso lab. 80
C1405DJR Ciudad Autónoma de Buenos Aires, Argentina

*Abstract*.—New species of the until now monotypic buccinoidean genera *Germonea* and *Drepanodontus* are described from the southwestern Atlantic waters. These genera are only otherwise known from lower bathyal and abyssal depths of Scotia Sea. *Germonea costulosa* n. sp. collected near Namuncurá/Burdwood Bank in 681 to 785 m depth is the second known species of the genus characterized by distinctive regular ribs. In addition, *Drepanodontus peonza* n. sp., collected from the same area, is similar to the type species of this genus with two distinctive spiral cords along all whorls. The bathymetry of both new species is shallower than that of the already described species, at upper slope depths. Geographically the new species put both genera on both sides of the Antarctic convergence. Previous reports include *D. tatyanae* sharing this distribution rising some questions about the effectiveness of the Drake passage as a barrier.

**Keywords:** Mollusca, Buccinulidae, southwestern Atlantic, *Germonea, Drepanodontus*, Buccinoidea, Neogastropoda, Namuncurá/Burdwood bank.

The last large account of Buccinoidea from deep-waters of the Southern Seas was published more than a decade ago by Harasewych & Kantor (2004). The authors described several deep-sea genera and species including *Germonea* and *Drepanodontus* among them. In addition, they compiled an appendix with all genera described in the so-called family Buccinulidae where these authors included most of the Buccinoidea genera from the Southern seas following the taxonomic arrangement proposed initially by Finlay (1928) and followed by Powell in several works (1929, 1951). Vaux et al. (2017) found that the Buccinulidae, usually considered a compact group in New Zealand, are not monophyletic. In this way, the concept of lower level taxa in Buccinoidea is still fluctuating.

Buccinoidea is probably one of the most species rich group in the southwestern Atlantic in general and in the Burdwood bank area in particular. This area, known locally as Namuncurá Bank, is located about 150 km east of Isla de los Estados (off the eastern tip of Tierra del Fuego) and 200 km south of the Malvinas (Falkland) Islands. Recent efforts to collect new material from these apparently well-known areas of the southwestern Atlantic resulted in a productive collection where several new species of different genera were recognized (Pastorino 2016, 2019). Among them, *Germonea* Harasewych and Kantor, 2004 and *Drepanodontus* Harasewych and Kantor, 2004 are two recently described genera from abyssal and lower slope samples from the Scotia Sea. The large

gpastorino@macn.gov.ar
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depths of the abyssal waters where they were collected are the most probable reason for them to be unknown until recent times. Both genera are so far monospecific and have a particular shell and radular features that are distinctive. In this paper two new species of these genera collected in shallower but still deep-waters are described.

## Materials and Methods

The specimens here studied were sampled by the R/V Puerto Deseado during several cruises, to the surroundings of Tierra del Fuego Island. Most of the specimens with soft parts were collected on March 2016 from 6 stations nearby Namuncurá/Burdwood Bank after sampling with bottom trawl net and an adapted Agassiz dredge. All materials were preserved in 96% ethanol. Radulae were obtained from preserved specimens, cleaned with commercial bleach (sodium hypochlorite), coated with gold-palladium and examined with a Philips XL30 scanning electron microscope at the Museo Argentino de Ciencias Naturales "Bernardino Rivadavia" (MACN).

Shells were photographed using a Nikon D100 camera with a Micro Nikkor lens of 60 mm and digitally processed with Adobe Photoshop suite software. All the specimens are housed at the invertebrate collection of the MACN.

This work has been registered in ZooBank with the registration numbers: *Germonea costulosa* n. sp. lsid:zoobank.org:act:2FEE8AE6-5962-4AD2-BCB8-ABE694B508AC and *Drepanodontus peonza* n. sp. lsid:zoobank.org:act:E7F51335-C8AD-4C1C-947D-0CECC087EB2A.

## Systematics

Class Gastropoda Cuvier, 1797
Order Neogastropoda Wenz, 1938
Superfamily Buccinoidea Rafinesque, 1815
Family Buccinulidae Finlay, 1928
Genus *Germonea* Harasewych & Kantor, 2004

*Type species.*—*Germonea rachelae* Harasewych & Kantor, 2004 by original designation.

### *Germonea costulosa* n. sp.
Figs. 1A–K, 2A–E

*Description.*—Shell medium sized, moderately thin, up to 43.4 mm in height, fusiform, of four convex, whorls; protoconch wide, globose, somewhat depressed, of 2 3/4 slightly convex whorls, with 2–5 spiral cords, transition to teleoconch distinct; suture impressed; aperture elliptic with the posterior angle acute, outer lip moderately thick, slightly reflected; siphonal canal deep and moderately long; parietal callus very thin; growth lines irregularly and closely spaced all over the shell; axial ornamentation of regularly spaced, thin varices, 13–15 in first teleoconch whorl, 19–22 to 26–28 in last two; spiral ornamentation of 13 flat cords in first teleoconch whorl, 16–24 in second to about 71 in last; growth lines all over shell forming scaly aspect when crossing cords, periostracum lacking. Shell color dirty white to yellowish creamy; interior white. Operculum brown, elliptic; nucleus subterminal, attachment area small, ovate.

Radula rachiglossate, long, similar to the type species. Central tooth with three cusps, central larger, directed along the central axis, lateral cusps smaller pointing toward laterals; base thick, quadrangular, strongly curved in the center; lateral teeth with three, wide, similar sized, triangular cusps; base of laterals prolonged.

Penis large, with a thin, long papilla rising from a cavity at the tip.

Two thick tentacles with large eyes at base are clearly visible.

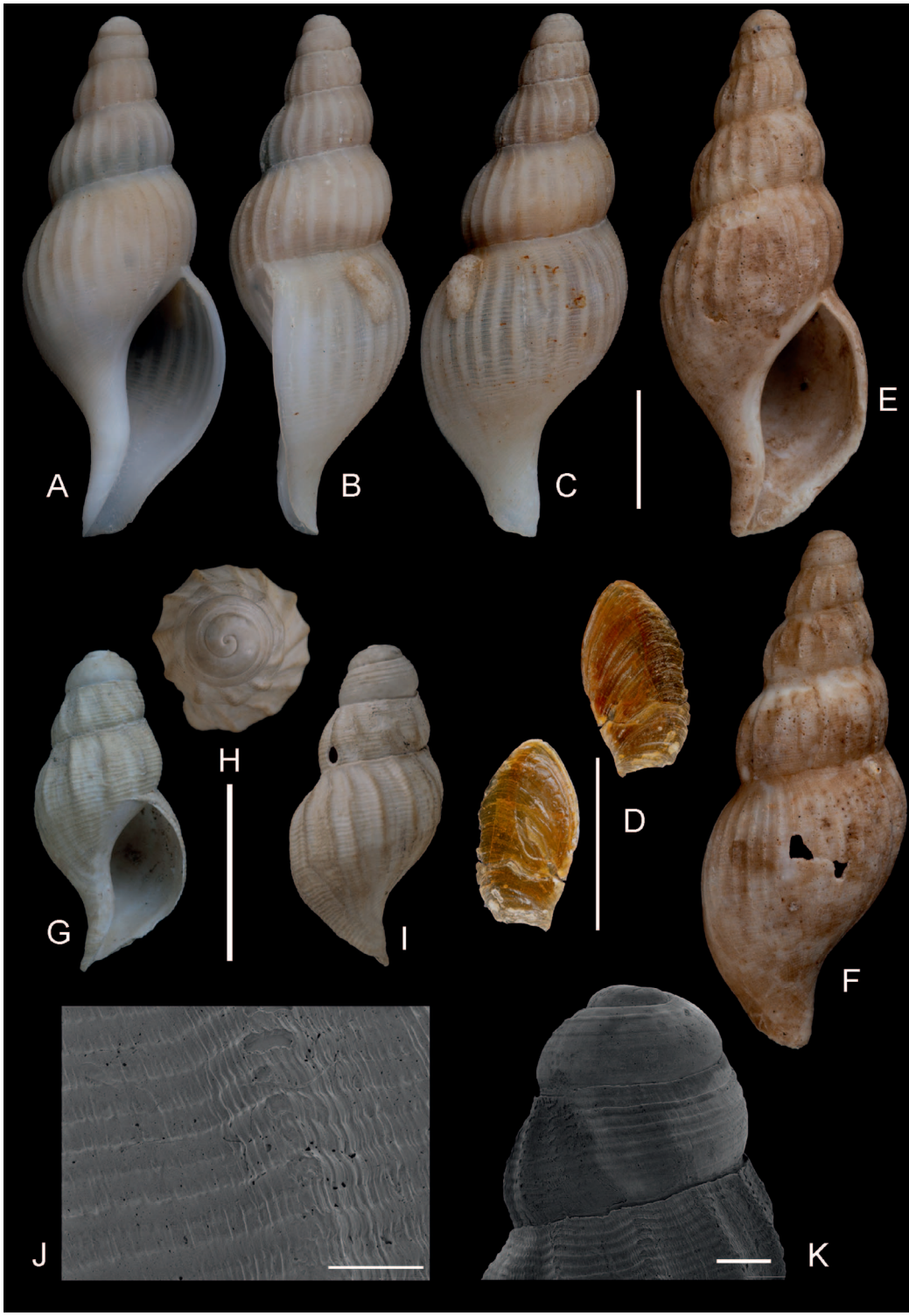


Fig. 1. *Germonea costulosa* n. sp. A–D. Holotype (MACN-In-43741) apertural, lateral and adapertural views, D. two views of operculum. E–F. Paratype (MACN-In-43743), apertural and adapertural views. G–I. Paratype, (MACN-In 43742), apertural, apical and adapertural view of shell. J. SEM uncoated detail of the ornamentation, (MACN-In 43742). K. SEM uncoated protoconch, (MACN-In 43742). Scale bars: A, B, C, E, F, G, I, H, = 1 cm. J. = 500 μm. K. = 1 mm.

*Type material*.—Holotype, MACN-In 43741 (complete) and two paratypes (shell only) MACN-In 43742 and 43743.

*Type locality*.—54°53′13.08″S, 59°48′54.00″W in 785 m depth (live specimen).

*Material examined*.—MACN-In 43741 (Holotype), 54°53′13.08″S, 59°48′54.00″W in 785 m depth, St. 239, collected alive on April 13 2016, with bottom trawl net; MACN-In 43742 (paratype, shell only), St. 239; MACN-In 43743 (paratype, shell only), 54°41.79S, 62°47.201W in 681 m depth, St. 175, collected on April 9 2016, with bottom trawl net. All material from Namuncurá/Burdwood bank Expedition.

*Distribution*.—Only known from two stations, both from Namuncurá/Burdwood Bank surroundings, between 681 to 785 m depth (live specimen).

*Etymology*.—The species is named after the presence of conspicuous varices on the shell surface.

*Remarks*.—This is the second species described after the type species of the genus, *G. rachelae* Harasewych and Kantor, 2004. Three specimens, only one with soft parts are known of *G. costulosa* n. sp. however, it is easily recognized as new because of the distinctive regular ribs. Nevertheless, the fusiform profile and the spiral cords are similar in both two known species. Radula of both species of *Germonea* have the same teeth and cusps arrangement, however, *G. rachelae* shows a fourth external cusp in some lateral teeth (see Fig. 89:22 in Harasewych & Kantor 2004) that are not seen on the new species. Penises of both species are also similar however, the papilla on the new species appears to be at least three times longer and tapering at the tip (Fig. 2E, F). Despite the geographic proximity of the species, *G. rachelae* was recorded from the abyssal plain and lower slope of Scotia Sea in 2196–3714 m while *G. costulosa* n. sp. deepest samples are from 785 m depth.

## Genus *Drepanodontus* Harasewych & Kantor, 2004

*Type species*.—*Drepanodontus tatyanae* Harasewych & Kantor, 2004 by original designation.

### *Drepanodontus peonza* n. sp.
Figs. 3A–L, 4A–C

*Description*.—Shell medium sized, thin, up to 43 mm in height, biconic, of six convex whorls; protoconch small, conic, of about 2, smooth, translucid whorls, transition to teleoconch unclear, protoconch first whorl sunken, surrounded by a single cord that vanished after two whorls, leaving a concave profile in second whorl that later became flat; suture impressed; aperture wide, oval; outer lip sharp; siphonal canal deep and very long, about ¼ of total shell length; parietal callus extremely thin and narrow; axial ornamentation of regularly spaced growth lines, somewhat scaly when crossing spirals; spiral ornamentation of 1–3 small cords in upper half of first two whorls, 12–15 in the 3rd, 16–24 in the second to 71 in the last; after 2nd whorl two larger peripheral cords that become 6–7 in the last whorl, producing an angular shell profile; growth lines all over the shell, periostracum lacking. Shell color dirty white to creamy; interior white. Operculum brown, elliptic; nucleus subterminal, attachment area small, ovate.

Radula rachiglossate, rachidian tooth with central cusp sharp, thin, larger than two or three laterals at each side, obsolete denticles barely visible at the end of rachidian margin; base wide, rectangular; lateral teeth curved, with one external very large, sharp cusp, internal cusp short, blunt; three intermediate smaller cusps, dissimilar sized, triangular cusps; base of laterals prolonged forming acute angle.

Penis long, flat with a terminal, very small papilla rising from a cavity.

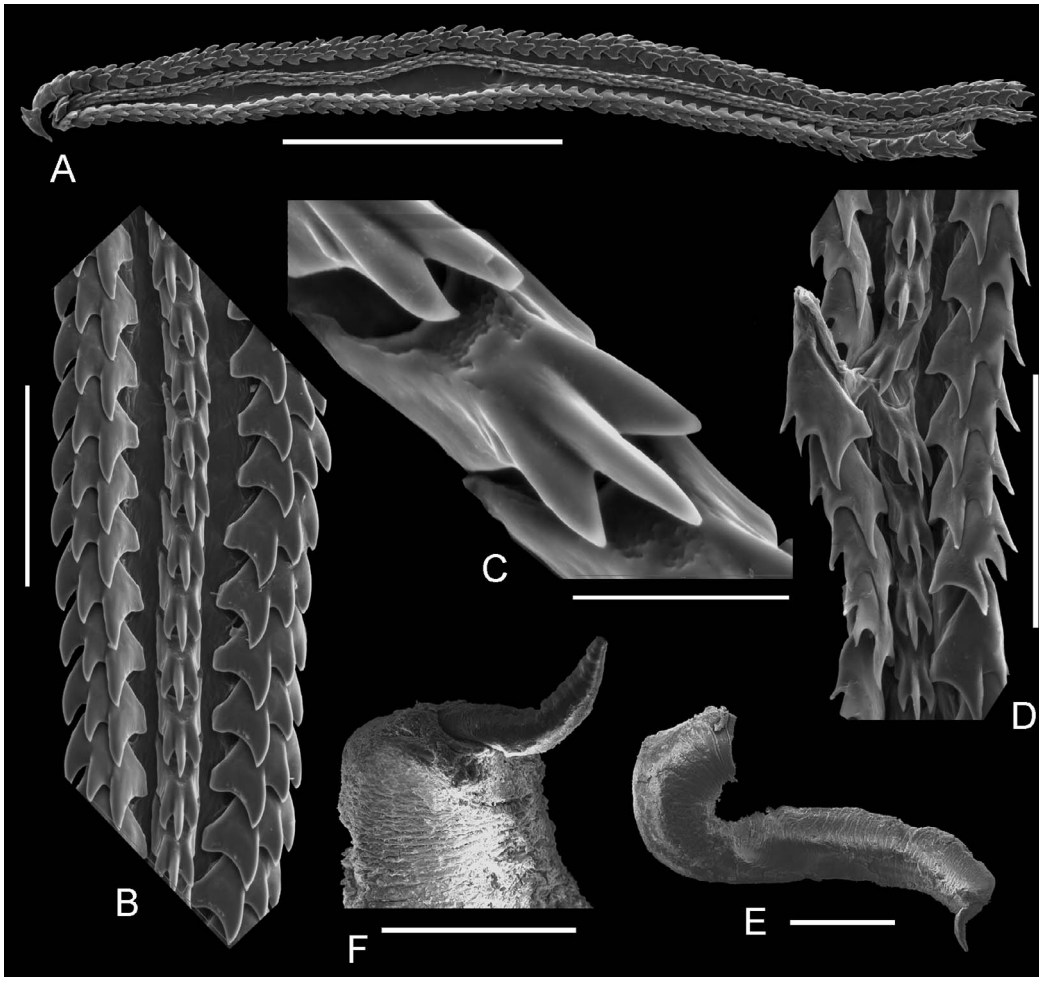


Fig. 2. *Germonea costulosa* n. sp. A. Radula dorsal view of the holotype. B. Closeup of the radula in A. C. detail of the rachidian tooth. D. Another closeup of the extreme of radula in A. E. Penis of the holotype. F. detail of the tip of the penis in E. Scale bars: A. = 1 mm, B. = 200 μm, C. = 50 μm, D. = 200 μm, E. = 2 mm, F. =1 mm.

Small tentacles with large eyes at base clearly visible.

*Type material*.—Holotype, MACN-In 43744 (shell) and 7 paratypes (3 specimens and 4 shells), MACN-In 43745, MACN-In 43746, MACN-In 43747.

*Type locality*.—54°35′54.12″S, 62°51′19.14″W, 608 m depth, St. 172, Namuncurá/Burdwood Bank expeditions.

*Material examined*.—MACN-In 43744 and 43745, 2 specimens, 54°53′13.08″S, 59°48′54.00″W, in 785 m depth, St. 239, collected on April/13/2016; MACN-In 43746, 2 shells, St. 172, 54°35′54.12″S, 62°51′19.14″W, in 608 m depth, collected on April/09/2016; MACN-In 43747, 3 shells, 1 specimen, collected on April/28/2017, St. 118, 54°24.331′S, 62°49.274′W in 483 m depth. All material from Namuncurá/Burdwood Bank expeditions, collected with bottom trawl net.

*Distribution*.—Only known from deep waters surrounding Namuncurá/Burdwood bank area, between 483 to 785 m.

*Etymology*.—The species is named after some similarity in shell morphology with a

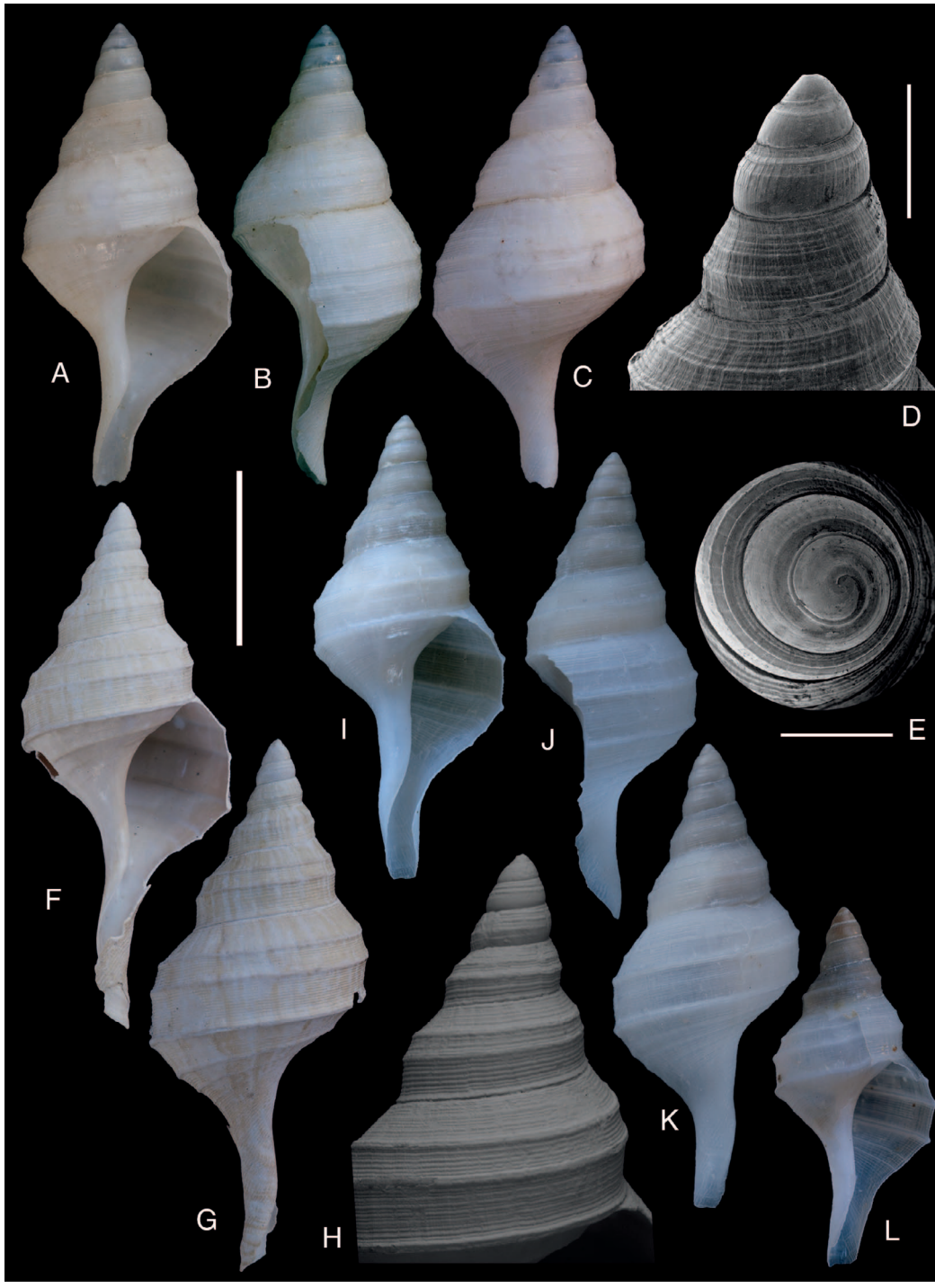


Fig. 3. *Drepanodontus peonza* n. sp. A–C. Holotype (MACN-In-43744) apertural, lateral and adapertural views. D–E. paratype (MACN-In-43745), two SEM views of uncoated protoconch of specimen in Fig. L. F–H. Paratype, (MACN-In 43746), F–G. Apertural and adapertural view of shell and H. detail of the protoconch and first whorls. I–K. Paratype (MACN-In 43747). L. Paratype, (MACN-In 43745), Scale bars: A, B, C, F, G, I, J, K, L, = 1 cm. D. = 2 mm. E. = 1 mm.

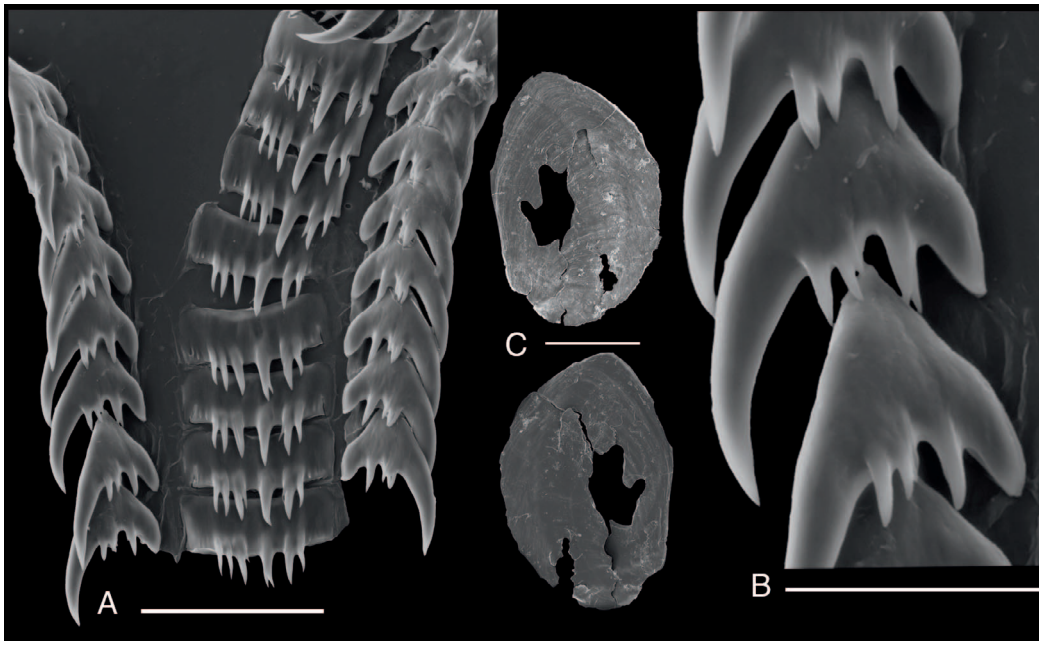


Fig. 4. *Drepanodontus peonza* n. sp. A. Radula dorsal view. B. Detail of the marginal tooth. C. Internal and external view of the operculum. Scale bars: A. = 100 μm, B. = 50 μm, C. = 2 mm.

spinning top (in Spanish peonza) a traditional toy in certain countries with Spaniard heritage.

*Remarks.—Drepanodontus peonza* n. sp. is similar in shell profile to the type species *D. tatyanae* Harasewych & Kantor, 2004. The main differences are the two larger spiral cords distinguished in all whorls in the new species while in *D. tatyanae* all cords are of similar thickness. The first whorls of both species are similar in shape, however, after the forth whorl the shell increases the width, showing the characteristic convex profile more developed in the new species. This elongated profile of the shell of *D. peonza* n. sp. showed some resemblance to the shell of some species of *Aforia* a common genus of Conoidea living in the area.

According to the radula of *D. tatyanae*, the type species illustrated by Harasewych & Kantor (2004 Figs. 36–40) the shape of the rachidian base is somewhat narrower and with a variable number of denticles in laterals and central teeth. Despite this, the same general teeth arrangement could be recognized in both known species granting the generic assignment. Penis and operculum are similar in both species.

## Conclusions

Two new species are herein described and belong to the formerly monotypic genera *Germonea* and *Drepanodontus*. Harasewych & Kantor (2004) suggested affinities of *Germonea* with some Prosiphinae with similar radulae (e.g., *Prosipho spiralis* Thiele, 1912, *P. crassicostatus* (Melvill & Standen, 1907) and *Anomacme smithi* Strebel, 1905). However, all three species have the typical Prosiphinae very long and narrow process in the base of the lateral radula teeth, while both known *Germonea* species have a shorter and triangular tip at the base instead. In addition, the shell height of the species here described, *G. peonza* n. sp., is at least twice as large as any of the others.

Also, Harasewych & Kantor (2004) compared the radula of *Drepanodontus* with that of *Kapala* Ponder, 1982 (*K. bathybius* Bouchet & Warén, 1986). *Kapala* was replaced with *Buccipagoda* by Ponder (2010) because of the homonymy with Cameron (1884). Later *Buccipagoda bathybius* was included in *Sagenotriton* Marshall & Walton, 2019. The radula of *S. ajax* Marshall & Walton, 2019 as well as that of *Buccipagoda kengrahani* (Ponder, 1982), the type species of *Buccipagoda*, are really similar among them. They have only one central cusp in the rachidian tooth with sometimes one or two obsolete denticles on each side, while *Drepanodontus* species have usually more than one cusp, one central larger and several laterals smaller. The lateral teeth are also similar. However, judging by the illustrations of the species included in the three genera, *Buccipagoda*, *Drepanodontus* and *Sagenotriton*, there is more variation on the latter than on the other two. In any case, the shells are very different in all the three genera. The particular protoconch of *Drepanodontus*, with the first whorl conical, is slightly sunken and with a marginal cord that is clearly distinctive from the other two genera.

Previous records of these two genera, *Drepanodontus* and *Germonea*, were located from very deep waters of the abyssal plain of the Scotia Sea, close to South Georgia and South Orkney Is. and the adjacent Argentine Abyssal Plain and the lower slope in both sides of the Antarctic convergence. Both known species of *Drepanodontus* have a large difference in the bathymetry where the specimens were collected, while those of *D. tatyanae* were sampled from 2740 m to 5768 m, all known materials of *D. peonza* n. sp. are from less than 785 m depth. Something similar occurs with *Germonea* species, where all known specimens of *G. rachelae* are from about 2196 to 3714 m and those of *G. costulosa* n. sp. never reach 800 m depth. Nevertheless, it is interesting to point out that both genera are distributed on both sides of the Antarctic convergence (or Drake Passage). However, only one species, *Drepanodontus tatyanae,* was actually collected north and south of the Drake passage albeit in very deep waters, a fact that it is at least unusual for invertebrates with non free larvae. Nothing is known about the reproductive modality of the species of *Germonea* and *Drepanodontus*, however, as far as it can be seen by the size and number of whorls of its protoconchs, hatching as a crawling juvenile is probably the case for these species.

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