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Tonna melanostoma (Jay, 1839)
Norfolk Island
Photo: S. Prior



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***Tonna melanostoma* (Jay, 1839) (Mollusca: Gastropoda), the black-mouthed tun: A rare find in the channel between Slaughter and Emily Bays, Norfolk Island**

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Keywords: Caenogastropoda, Littorinimorpha, Tonnoidea, Tonnidae, Norfolk Island, Emily Bay, Slaughter Bay, pollution, *Caulerpa taxifolia*.

Abstract: The distribution range of *Tonna melanostoma* (Jay, 1839) is here discussed and confirmed as extending eastward to Norfolk Island based on observations by the first author. Images of the animal in natural habitat are provided. Some notes on Norfolk Island and the local pollution are recorded.

General notes about Norfolk Island: Norfolk Island was settled by Pacific seafaring Polynesians between c. 1150 and c. 1450 CE. It was first discovered and named by Captain James Cook for the British during his second voyage on 10 October 1774, when he described it in his journal. Fourteen years later, in 1788, and just six weeks after they arrived in Port Jackson, the British arrived on the island and created the first of the convict settlements. Since 1856, it has been home to the Pitcairners – descendants of the *Bounty* mutineers.

Norfolk Island is unique. Just 5 km by 8 km, 29.3S, 177.9W, and 1600 km from the east coast of Australia, the island is encircled by cliffs, apart from the low-lying southern coastal plain. This plain is where the World Heritage convict settlement of Kingston is located. Here Slaughter and Emily Bays and the more exposed Cemetery Bay can be found with their fringing coral reefs. Not only is this one of the most southerly coral reefs in the world, but the island is also surrounded by an Australian Marine Park.

The first author first lived on Norfolk Island for a period of almost five years in the late 1990s. She returned to live on the island three years ago. She regularly swam in the bays then, and resumed those daily swims when she returned.



Fig. 1: Emily Bay, Norfolk Island. Photo: S. Prior



Fig. 2: Screenshot taken from Google Earth, 21 May 2021. Right bay: Emily Bay; upper left: Slaughter Bay, with the narrow, slightly deeper channel between them. Both bays are somewhat protected from the surf by the coral reef head (bottom left).

Notes on the distribution range of *Tonna melanostoma* (Jay, 1839): Only a few species of *Tonna*, including *Tonna melanostoma* (Jay, 1839), *Tonna perdix* (Linnaeus, 1758) and *Tonna tankervillei* (Hanley, 1860) are sometimes observed in the bays of Norfolk Island, where they are not a common sight. They are usually

found in the channel area between Emily and Slaughter Bays where waters reach a depth of up to 5 metres.

The recent observation of a live specimen of *Tonna melanostoma* is amongst the southernmost observations of the known range for that species and provides the first public photographs of that species, as present in Norfolk Island's coral reef lagoon.

Systematics:

Phylum: Mollusca

Class: Gastropoda

Subclass: Caenogastropoda

Order: Littorinimorpha

Superfamily: Tonnoidea Suter, 1913 (1825)

Family: Tonnidae Suter, 1913 (1825)

Genus: *Tonna* Brünnich, 1771

Species: *Tonna melanostoma* (Jay, 1839)

Vernacular: Black-mouthed tun; Black-lipped tun

The first author regularly observed specimens of *Tonna* in the late 1990s, but not so frequently anymore in recent years. She now carries a camera and records anything of interest, uploading some of these observations to the iNaturalist website.

iNaturalist is a joint initiative of the California Academy of Sciences and the National Geographic Society. iNaturalist is a global citizen science community that feeds research-quality data to scientists. It is the kind of website for which the Internet was invented: open-source projects, open datasets and public APIs – it has created a small revolution among amateur naturalists and conservationists, who are now able to easily share observations, such as this one.

The images of *Tonna melanostoma* provided here were taken on 10 May 2021 at 2.40 pm (low tide that day was at 1.20 pm, the water temperature would have been between 21 °C and 22 °C) and uploaded later that afternoon with an appended note from the author stating that it was unusual to see these molluscs out and about during daylight hours. When lucky enough to see one, they can usually be observed early in the morning, or the top of the large globular shell may be exposed slightly where they bury themselves in the sandy areas of the channel. iNaturalist curator Ben Travaglini suggested the identification of *Tonna melanostoma* later that afternoon, which was soon confirmed by others.

Tonnidae are nocturnal hunters, crawling at relatively high speed by means of their large foot, in search for their preferred holothuria. As such it is a lucky shot to encounter one during daytime, when they are usually (mostly) buried in the sand, protecting themselves from predators.



Fig. 3: Local snorkeller, Ian Mann, photographing a half-buried *Tonna tankervillei* (Hanley, 1860), 15 June 2020. Photo: S. Prior

Brief historical account of some (not all) recorded localities:

In 1839, in his *Catalogue of shells, arranged according to the Lamarckian system; together with descriptions of new or rare species*, Jay described the species *Dolium melanostomum* from the “Friendly Islands” – today known as Tonga. This locality was also referred to by Reeve (1849, sp. 2, pl. 2 - “Friendly Islands” after Jay, 1839, *auct*), Philippi (1849: 11 - “*Insulae Amicorum*”) and Küster (1857: 67 - “*Freundschafts-Inseln*”).

Brazier (1871: 585, as *Dolium melanostoma* [sic]) argued that the locality as given by Reeve (1849, sp. 2) must have been erroneous, seen as his own specimens originated from a different locality (Elisabeth Reef, 450 miles east of Port Jackson Heads *fide* Brazier). In that same year, Pease (1871: 23-24) reported samples of “*Dolium melanostomum* Jay, 1839” from the Hawaiian Islands, where according to him it was rare (“*I have heard of but 2 having been found in the past fifteen years*”, *fide* Pease). Pease furthermore mentioned that the species would be more common near “small islands, 500 miles to the west” [of Honolulu, *auct*]. As he further refers to French Frigate Shoals – situated about 902 km NW of Honolulu – it is here assumed that with “small islands”, he means the chain of islands between Honolulu and Midway, today better known as the Leeward Islands as a part of the Hawaiian Islands. Further investigation as to the exact species Pease refers to is still required, as *Tonna hawaiiensis* Vos, 2007 is typically found near the Leeward Islands.

Tryon (1885: 261) copied Brazier's locality of Elisabeth Reef, yet adds Friendly Islands (after Jay) and Hawaiian Islands (after Pease). He furthermore expresses doubt with regard to the identity of the specimen figured by

Reeve, and insinuates a possible synonymy of *Tonna melanostoma* with *Tonna luteostoma* (Küster, 1857). Reeve's figured specimen from the Tankerville collection was examined by the second author upon a research visit to NHMUK in 2006, and concluded to be a specimen of *Tonna melanostoma*.

Iredale & Allan (1914: 48) recorded the species from Lord Howe Island, and Powell (1967: 190, pl. 36, figs 6–7) considered *Tonna melanostoma* as widely distributed in the tropical Pacific, and occasionally taken at the Ryukyu Islands [East China Sea, *auct.*] on fine sandy bottom in from 5 to 20 metres (after Habe, 1964). His report of this species from New Zealand is based on a live-taken specimen from off the Cavalli Islands, and another trawled off Doubtless Bay. A third specimen was found beached at Spirits Bay (after Powell, 1967).

Tinker (1949: 304-305, pl. 1, top row centre and right) reported "*Tonna melanostoma*" from the Hawaiian Islands, "where it is abundant" (Tinker, 1949: 304). As for distribution, Tinker mentions "Indo-Pacific, including Hawaiian Islands". Further records of the Hawaiian species under the name *Tonna melanostoma* were listed (a. o.) by Kay (1979: 230); Matsukuma, Okutani & Habe (1991, pl. 53, fig. 2 (only)); Severns (2000: 79). Vos (2007) examined specimens of *Tonna melanostoma* in comparison to a large number of specimens from the Hawaiian Islands, concluding that the Hawaiian specimens belong to a different species, duly naming it *Tonna hawaiiensis* Vos, 2007.

Tröndlé & Boutet (2009: 23) reported *Tonna melanostoma* specimens from the Society Islands and Austral Islands (French Polynesia).

Zhang & Ma (2004) did not mention *Tonna melanostoma* as a part of the fauna of Chinese waters. Vos (2013) elaborated on that subject, and resumed the distribution as: "It is known from Tonga and New Caledonia, northernmost New Zealand and Norfolk Island, and in the north from around Japan (Takashige, H. and Masuko, H. (both Shizuoka, Japan); pers. comm. 2011). This species was recently also reported from French Polynesia (Beu, Bouchet & Tröndlé, 2012: 106). 3 young specimens (100.8 mm; 103 mm; 108.03 mm) trawled at depths between 350-380 m in the East China Sea, and 1 specimen (74 mm) trawled at 150m in East China Sea are present in the collection of Dirk De Boe (Belgium); one specimen (92 mm) trawled at 300m in East China Sea in the collection of Trevor Young (Queensland, Australia) and one specimen (103.6 mm) trawled live on sand bottom at 300m in East China Sea is in the collection of the present author. These most probably represent a pseudo-population originating from larval drift originating from the populations inhabiting the Japanese waters, which currently find sufficient food sources and a suitable habitat at great depth on the shelf between

mainland China and Kyushu, southern Japan."

Despite extensive search for further distribution records, it still remains remarkable that *Tonna melanostoma* appears to be found relatively regularly in Japanese waters including the Ruykyu Islands (East China Sea), and in the southern Pacific as far south as northern New Zealand, yet not in between (e. g. Philippines, Papua New Guinea). At present, the authors are not aware of any expeditions / expedition results on the ridges including Ogasawara and Hahajima Islands, Marianas and Guam including specimens of Tonnidae.

An extensive search of the various databases and papers on the family Tonnidae does not reveal any images of the actual animal, giving the authors reason to believe that these are the first ones to be made available publicly.



Fig. 4: *Tonna melanostoma* (Jay, 1839), 10 May 2021.
Photo: S. Prior

Whereas earlier sightings of this species have often been the result of trawling at depths of 80 to 300 metres or more - suggesting that this species normally lives in deeper water - the first author and fellow snorkellers in the bays on Norfolk Island have seen this species before and it is known to them to inhabit the shallow sandy lagoons there and has done so over a period of many years.

The first author was also able to photograph *Tonna* egg casings in the channel, not far from the sighting, on 27 March 2021 and again on 10 April 2021. It is, however, not known from which species of *Tonna* these egg casings originate, as the three above-mentioned species are likely to frequent the channel between Emily and Slaughter Bays.

The first author has established a collection of *Tonna* shells collected in the late 1990s. A couple of these, she recalls, were collected in the much shallower and more exposed Cemetery Bay.

The *Tonna melanostoma* was left untouched and was not present at the same location the following or subsequent days.



Fig. 5: *Tonna* sp. egg casings, 10 April 2021.
Photo: S. Prior



Fig. 6: *Tonna melanostoma* (Jay, 1839), 10 May 2021.
Photo: S. Prior

Notes on the pollution occurring at the reef on Norfolk Island: It is worth noting that the reef on Norfolk Island is under stress. Rapid reef health monitoring was undertaken by the Sydney Institute of Marine Science (SIMS) on behalf of Australian Marine Parks from March 2020 to April 2021. The SIMS' report 'Norfolk Island Lagoonal Reef Ecosystem Health Assessment 2020–2021' found that algal blooms in the water column, bleaching, increased algal growth and coral diseases, are all problems caused directly by contaminated water entering the Emily Bay and Slaughter Bay lagoons. In addition, a stormwater event at the end of July 2020 posed a significant health risk to recreational users of the bays. The report concluded that the coral reefs at Norfolk Island's Emily and Slaughter Bays are in poor and declining health with increased algal cover and incidents of disease, due to historic and ongoing wastewater management issues.



Figs. 7-8: *Tonna melanostoma* (Jay, 1839), collected at Norfolk Island in the late 1990s, now in collection S. Prior.
Photos: S. Prior

It is of concern to the first author that there is an ever-thickening and more luxuriant growth of the species *Caulerpa taxifolia* (M. Vahl), C. Agardh 1817, thriving in the high nutrient environment, particularly in the deeper channel area where there used to only be stretches of sand. One snorkeller witnessed a *Tonna* trying to bury itself in the sand, as is their habit, but it was unable to do so because of the thick weed there.

The SIMS report, among other things, recommends undertaking ongoing investigations, monitoring and rehabilitation of the inshore coral reef lagoon of Emily and Slaughter Bay in order to support resilience for the Norfolk Island coral reef ecosystem.

Addendum: Specimen records consulted:**Abbreviations used:**

AMS:	Australian Museum (Sydney, Australia)
ANSP:	Academy of Natural Sciences (Philadelphia, USA)
CCC:	Collection Chong Chen (Yokohama, Japan)
CCV:	Collection Chris Vos (Zichem, Belgium)
CDO:	Collection Dirk & Mo De Boe-Overweg (Overpelt, Belgium)
CSP:	Collection Susan Prior (Kingston, Norfolk Island)
FMNH:	Field Museum of Natural History (Chicago, IL, USA)
MCZ:	Museum of Comparative Zoology, Harvard (Cambridge, MA, USA)
MNHN:	Muséum national d'Histoire naturelle (Paris, France)
MONZ:	Museum of New Zealand – Te papa Tongarewa (Wellington, New Zealand)
NATURALIS:	Naturalis Biodiversity Center (Leiden, The Netherlands)
NHMUK:	Natural History Museum (London, United Kingdom)
NMNH-SI:	National Museum of Natural History; Smithsonian Institutions (Washington, DC, USA)

Specimen records consulted:

All consulted records were identified as *Tonna melanostoma* (Jay, 1839) unless otherwise stated below.

7 samples, **AMS** (as listed on <http://collections.australian.museum/amweb/pages/am/Query.php>): C.123159: Solomon Islands (8° S, 158° E), 1877; C.40056: Solomon Islands (8° S, 158° E), 1905; C.449660: Tasman Sea, Australia, Elizabeth Reef, (29° 55' 23" S, 159° 2' 42" E), 12 Dec 1987; C.87956: New Zealand, Kermadec Ids, Raoul (Sunday) Is., (29° 15' S, 177° 52' W), 1908; C.51960: Solomon Islands, Santa Cruz Ids, Vanikoro, (11° 42' S, 166° 50' E), Jul 1926; C.156139: Tasman Sea, Australia, Elizabeth Reef, (29° 57' S, 159° 2' E), 13 Dec 1987; C.123158: Australia, New South Wales, Lord Howe Island, (31° 33' S, 159° 5' E), 1950. The identifications of these 7 samples were not confirmed to the authors prior to the deadline for submission. As such, their identity cannot be confirmed here. 2 samples **ANSP** (as listed on <http://clade.ansp.org/malacology/collections/search.php>) 306640: Sea Flats, Ahan Village, 12 mi. W of Nu Ku Alifa, Tonga Islands; 186412: Friendly Islands. The identifications of these 2 samples were not confirmed to the authors prior to the deadline for submission. As such, their identity cannot be confirmed here. 1 shell, **CCC**, Approx. 235.9 mm, In fishing net, Off Kakeromajima, Amami Islands, Kagoshima Prefecture, Japan, June

2007, taken at -60-80 m; 1 shell, **CCV** (TT0316), Approx. 300 mm x 240 mm, Tonga, live taken in shallow water (depth uncertain). (also see: Vos, 2007: pl. 45, f. 1; pl. 46, f. 1, 2012: Pl. 1, figs. 1a-b; 2013: Pl. 1, Figs. 1a-b); 1 shell, **CCV** (TT0968), Approx. 103 mm x 83 mm, East China Sea, live taken at +/- 300m. (also see: Vos, 2012: 14; Pl. 8, figs. 2; 2013: 35; Pl. 8, Figs. 2); 4 shells, **CDO**, 74 mm, 100.80 mm, 103 mm, 108.03 mm, East China Sea, respectively taken at 150 m, 380 m, 350 m and 350 m. (also see Vos, 2013:35); 1 shell, **CSP**, Approx. 170 mm x 150 mm, Norfolk Island (late 1990s); 1 shell, **FMNH**, FMNH 344991, from the Byron Torke collection, Necker Island, French Frigate Shoals, Leeward Islands, Hawaii, taken in lobster trap in 350 feet of water, F/V Dominus, 1991, examined by the second author and here considered a specimen of *Tonna hawaiiensis* Vos, 2007. 1 shell, **MCZ**, Guam, 13.44276° 144.769452°, Oct. 1962, initially listed on <https://mczbase.mcz.harvard.edu/guid/MCZ:Mala:332001> as *Tonna sp.* and later identified by the second author as *Tonna perdux* (Linnaeus, 1758); 1 shell, **MNHN**, Campagne BORDAU 2, N/O "Alis", Tonga, north-west Tongatapu, 22/06/2000, CP1643, 21°05'S, 175°22'W, 487 m. 3 samples, **MONZ** (also see <https://collections.tepapa.govt.nz/taxon/27151-identities> were confirmed by MONZ): M.081514:New Zealand, Great Exhibition Bay, Rarawa Beach; M.118080:New Zealand, Langs Beach, Bream Bay; M.277151:New Zealand, off Spirits Bay. 5 samples, **NATURALIS**: ZMA.MOLL.342540 Moluccas, Coll. J. C. Brandt, as "*Dolium melanostomum*", identified by R. Moolenbeek (2016) as *Tonna canaliculata* (Linnaeus, 1758), and here confirmed to be that species; ZMA.MOLL.342541 No locality data available, as "*Tonna melanostoma*", identified by R. Moolenbeek (2016) as *Tonna canaliculata* (Linnaeus, 1758), and here confirmed to be that species; ZMA.MOLL.342542 Coll. M. M. Schepman, Australia, as "*Dolium melanostomum*" and "*Tonna melanostoma*", identified by R. Moolenbeek (2016) as *Tonna canaliculata* (Linnaeus, 1758), and here confirmed to be that species; ZMA.MOLL.208190/2 Hawaii, ex-coll. P. Hessel, identified by R. Moolenbeek (2016) as *Tonna hawaiiensis* Vos, 2007, and here confirmed to be that species; ZMA.MOLL.208191/1 Hawaii, Oahu, North shore, ex-coll. P. Hessel, identified by R. Moolenbeek (2016) as *Tonna hawaiiensis* Vos, 2007, and here confirmed to be that species. 5 shells, **NHMUK**: 1 shell, NHMUK 20200922, Tankerville collection number 1901d (figured in Reeve, 1848. Conc. Iconica 5: species 2, plate II), 1 shell, no registration number, Hugh Cuming collection; 1 shell, NHMUK 1865.5.18.1, "purchased of Mr Pease"; 2 shells, no registration number, V. W. MacAndrew collection. All specimens were examined by the second author during a research visit in 2006, and considered to be *Tonna melanostoma* (Jay, 1839), with the exception of the specimen "purchased of Mr Pease". The latter specimen possibly belongs to *Tonna hawaiiensis* Vos, 2007, yet has

a rather bleached look and lacks locality data which makes positive identification difficult. It is very comparable to NMNH-SI 428415 (cf. infra) which is also a rather large (+250 mm) specimen with similar characteristics. Further examinations of large Hawaiian specimens are required before a positive conclusion can be drawn; 3 samples NMNH-SI (as listed on <https://collections.nmnh.si.edu/search/iz/>): 654292: Tonga, Tongatupa, Tonga Ids, L. G. Lancaster; April 1963, from fisherman, as "*Tonna melanostoma*", and here confirmed as that species; 603826 : Hawaii, Nankuli area, Oahu, 100 fms, ex-coll. Tinker, as "*Tonna melanostoma*", here identified as *Tonna hawaiiensis* Vos, 2007; 428415: Hawaii, Pearl & Hermes Reef, Stn 30, August, 1930, P. J. Galtsoff, as "*Tonna melanostoma*", here identified as *Tonna hawaiiensis* Vos, 2007.

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Report on a new record of a subspecies of *Amphidromus atricallosus* (Gould, 1843) from Sumatera, Indonesia (Gastropoda: Camaenidae)

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Keywords: Camaenidae, *Amphidromus*, *Amphidromus atricallosus*, subspecies, Sumatera.

Abstract: Three dead specimens and a live specimen of a small and ovate conical shell of *Amphidromus atricallosus* (Gould, 1843) were collected from Sumatera. They are similar to several specimens from near Bera, Pahang, Peninsular Malaysia, and to *Amphidromus atricallosus temasek* Tan, Chan, & Panha, 2011 from Singapore.

Introduction: *Bulimus atricallosus* Gould, 1843 was described as a species from Tavoy, British Burma (Pilsbry, 1900: 165). *Bulimus leucoxanthus* von Martens, 1864 was described as a species from Siam (Thailand) (Laidlaw & Solem, 1961: 635). *Amphidromus perakensis* Fulton, 1901 was described as a species from Perak, Peninsular Malaysia.

Laidlaw & Solem (1961) and Solem (1965) regarded *B. leucoxanthus* and *B. perakensis* as forms of *Amphidromus atricallosus* (Gould, 1843). Solem (1965) studied 179 specimens within the *A. atricallosus*-complex from Peninsular Thailand and Southeast Thailand and grouped them into four colour phases of shell, which are:

1. typical *atricallosus* (Gould, 1843): parietal callus brown or purplish black, usually with varices, relatively large with a size of 50-55 mm high, elongated.
2. form *leucoxanthus* (von Martens, 1864): varices present, parietal callus without dark marking, whiter, more obese, slightly smaller.
3. form *perakensis* Fulton, 1901: varices and parietal coloration absent, subsutural white zone usually more marked than in the other varieties, large, elongated.
4. form *laidlawi* Solem, 1965: whitish shell with narrow, rather crowded and pale brown radial streaks that parallel the growth lines. Usually with one or more varices.

Maassen (2001) considered *A. perakensis* Fulton, 1901 a subspecies of *A. atricallosus atricallosus* (Gould, 1843), including the small and ovate conical shells from Singapore. Sutcharit & Panha (2006) considered *A. leucoxanthus* and *A. perakensis* subspecies of *A. atricallosus atricallosus* and regarded *A. laidlawi* as a form of *A. atricallosus leucoxanthus*. In that paper, Sutcharit & Panha (2006) described a new subspecies: *Amphidromus atricallosus classarius*: its shell is small (height 35.2-43.9 mm), sinistral, elongate conical, with varices, blackish or brown parietal callus, and short penis, from Koh Tachai Island in Andaman Sea, southern Thailand.

A. atricallosus atricallosus, *A. a. leucoxanthus* and *A. a. perakensis* live in tropical areas: *A. a. atricallosus* inhabits Myanmar and Thailand, *A. a. leucoxanthus* Thailand and *A. a. perakensis* Thailand and Peninsular Malaysia. In Peninsular Malaysia, only *A. a. perakensis* (without varices) has been recorded, while *A. a. leucoxanthus* (with varices) has never been reported.

The ovate conical, rather small shell with a height of 37.4-46.9 mm, monochrome yellow colour without varices and originating from Singapore was described as *Amphidromus atricallosus temasek* Tan, Chan, & Panha, 2011.

Three dead specimens of an ovate conical, monochrome yellow species without varices were collected by the second author in Rokan Hulu, Riau, Sumatera, Indonesia in March 2017. A live specimen was also found, but the specimen was released after being photographed on the site. These specimens are basically the same as some specimens from near Bera, Peninsular Malaysia, and *A. a. temasek* from Singapore.

Abbreviations:

MZB: Museum Zoologicum Bogoriense, Cibinong, Bogor, Indonesia

BD: Bunjamin Dharma's collection

h: height, **w:** width, **ha:** height of aperture, **hlw:** height of last whorl

Systematics:

Family: Camaenidae H. A. Pilsbry, 1895

Subfamily: Camaeninae H. A. Pilsbry, 1895

Genus: *Amphidromus* J. C. Albers, 1850

Type species. *Helix perversa* Linnaeus, 1758

Amphidromus atricallosus temasek

Tan, Chan, & Panha, 2011

Figs. A-D, 1-3

Diagnosis: Shell small, up to 44.1 mm, dextral and sinistral, ovate conical or rather high conical, thick, little transparent, slightly polished. Whorls 6-6½, regularly increasing in size, slightly convex. Apex white, smooth and shining. Radial striae fine, spiral sculpture very weak. Ground colour monochrome yellow, subsutural zone white, varices absent. Suture shallow, somewhat crenulated by termination of radial striae. Aperture ovate, oblique, yellowish inside; perch angle 30°-32°. Parietal wall overlaid with thin callus. Peristome not continuous, white; outer lip expanded, thickened and recurved. Columellar side rather thick, vertical, slightly twisted. Umbilicus open or nearly closed, partially concealed by a fold and broadened columellar side. Measurement: height 42.8-44.1 mm, width 22.9-25.0 mm, height of aperture 21.8-22.8 mm, height of last whorl 31.1-31.4 mm, h/w= 1.71-1.93, ha/h= 0.49-0.53, hlw/h=0.71-0.73.

Animal body greyish-white, reticulated, head and neck brownish yellow, the recessed parts brownish, a yellow band on the upper side of the foot, tentacles brownish, eyes transparent light yellowish brown.

Material studied: Rokan Hulu, Riau, Sumatera, Indonesia: 2 specimens MZB Gst. 22.040, height 43.0 mm, 44.1 mm; 1 specimen BD, height 42.8 mm. Near Bera, Pahang, Peninsular Malaysia: 8 specimens. Singapore: 4 specimens.

Type locality: Singapore.

Distribution: Peninsular Malaysia; Singapore; Riau, Sumatera, Indonesia.

Habitat: Specimens from Rokan Hulu, Riau, Sumatera were collected in a rubber plantation surrounded by ferns.

Discussion: In *A. a. temasek* from Singapore, the columellar plait is not twisted, while the three specimens from Rokan Hulu, Riau, Sumatera are rather thick and somewhat twisted. Columellar plait of eight specimens from near Bera, Pahang, Peninsular Malaysia rather thick, simple, some slightly twisted. Shells of *A. a. leucoxanthus* and *A. a. perakensis* that have simple and twisted columellar plaits can be found together at the same location (Solem, 1965: 621). Variation of columellar plait may happen in *A. a. temasek*, even in those that come from different locations. The animal of the living specimen from Rokan Hulu, Riau, Sumatera (Figs A-D) is similar to that of *A. atricallosus temasek* from Singapore (Tan, Chan, & Panha, 2011: fig. 3A).

Acknowledgements: I am grateful to Mr. Ng Hiong Eng, Singapore who donated eight specimens of *A. a. temasek* from near Bera, Pahang, Peninsular Malaysia. I am thankful to Mr. Royston Koh, Malaysia and Mr. Chan Sow Yan, Singapore, both gave one specimen of *A. a. temasek* from Singapore. I also thank Mr. Sofjan Effendy, Jakarta, Indonesia, who lent two specimens of *A. a. temasek* from Singapore for this study.

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Plate 1:**1-9: *Amphidromus atricallosus temasek* Tan, Chan, & Panha, 2011****1-3:** Rokan Hulu, Riau, Sumatera, Indonesia**1:** 43.0 x 24.2 mm**2:** 44.1 x 22.9 mm**3:** 42.8 x 25.0 mm**4-6:** Near Bera, Pahang, Peninsular Malaysia**4:** 36.0 x 21.6 mm**5:** 40.8 x 24.7 mm**6:** 36.6 x 22.7 mm**7-9:** Singapore**7:** 39.5 x 25.4 mm**8:** 42.4 x 24.8 mm**9:** 40.5 x 25.6 mm

A-D: *Amphidromus atricallosus temasek* Tan, Chan, & Panha, 2011
Rokan Hulu, Riau, Sumatera, Indonesia.

New records of tropical gastropods from the Pliocene of Nicosia with the description of *Anacithara akisi* sp. nov. (Gastropoda: Horaiclavidae)

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Keywords: Gastropoda, Eastern Mediterranean, Pliocene, Cyprus, new species.

Abstract: In this paper the unexpected presence of the genus *Anacithara* in Cyprus' Pliocene is reported and *Anacithara akisi* sp. nov. is described as new to science. Three more thermophilic species are recorded for the first time in Cyprus' Pliocene and probably mentioned for the first time from the eastern part of the Mediterranean.

Introduction: The Pliocene molluscan fauna of Cyprus was recorded by various authors, including Gaudry (1871), Reed (1935, 1940), Moshkovitz (1968) and some more recent additions by Theodorou et al (2005). The most diverse list was by Cowper Reed (1935) with some additions in 1940, mentioning more than 350 species of Pliocene marine molluscs, out of which he described 16 new species and 8 new varieties as new to science. Although these authors jointly record up to around 500, there are many more that are still hiding in collections or waiting to be found. A more complete list will be made in the future with the accepted names and many additions. In this paper 3 species belonging to 3 different genera are recorded for the first time in the Pliocene of Cyprus: *Thala obsoleta* (Brocchi, 1814), *Olivella clanzigi* Lozouet, 1992, *Kyllinia parentalis* Garilli & Galletti, 2007 and 1 species is described as new to science: *Anacithara akisi* sp. nov. No living species of these genera is known to the Mediterranean and their fossil records in the Pliocene are poorly known.

Material and methods: The specimens were collected from 4 sites: 3 from the village of Arediou and 1 from the village of Deftera

Abbreviations:

RBINS: Royal Belgian Institute of Natural Sciences, Brussels, Belgium

DK: Demetris Kolokotronis collection, Cyprus

Systematics:

Subclass: Caenogastropoda Cox, 1960

Order: Neogastropoda Wenz, 1938

Family: Costellariidae MacDonald, 1860

Genus: *Thala* H. Adams & A. Adams, 1853

Type species: *Thala mirifica* (Reeve, 1845)

Thala obsoleta (Brocchi, 1814)

Plate 1, Figs 1-2

Locality: Arediou village, Nicosia, Cyprus

Material examined: 7 specimens from the Arediou village, from 2 sites.

Remarks: This species was recorded from a few locations in the Pliocene, as mentioned by Savelli & Reina (1983), including Bordighera and Bussano (Bellardi, 1888), Pyrenees Orientales (Fontannes, 1880), Castrocaro (Foresti, 1876), Beaulieu (Glibert, 1960), Altavilla (Savelli & Reina, 1983) and now in the Pliocene deposits of Nicosia in Cyprus.

According to Rosenberg & Salisbury (2003) the Recent species of the genus *Thala* can be found in many hot climates throughout the Tropical Indo-Pacific, from the Red Sea and South Africa to Hawaii.

Seven specimens were found, out of which 3 are almost complete, but all are missing the protoconch. They also show some variability in the size of fully-grown specimens, some of which are fully grown at 5.4 mm and some at 7.6 mm, which could be a tendency to sexual dimorphism as seen in *Thala floridana* (Dall, 1884) according to Maes & Ræihle (1975).

Superfamily: Olivoidea Latreille, 1825

Family: Olividae Latreille, 1825

Subfamily: Olivellinae Troschel, 1869

Genus: *Olivella* Swainson, 1831

Type species: *Olivella dama* (W. Wood, 1828)

Olivella clanzigi Lozouet, 1992

Plate 1, Figs 3-6

Locality: Arediou village, Nicosia, Cyprus.

Material examined: 55 specimens out of which 3 are juveniles. Found at 3 sites in Arediou village.

Remarks: The family Olividae was thought to have disappeared from the Mediterranean at the end of the Miocene due to the Messinian salinity crisis and supposedly did not re-enter due to the climatic conditions in the beginning of the Pliocene (Davoli, 1988). This hypothesis was not enough to explain the absence of this family as different species of the family were found in the Pliocene of Tunisia and Spain by Lozouet (1992), who also described the species mentioned in this paper: *Olivella clanzigi*. More recently, this species was also found by Landau *et al.* (2006) in Pliocene deposits in Estepona, southern Spain. The specimens mentioned by Landau show bigger sizes in all specimens than those found in Cyprus, where only a few are bigger than 13.5 mm, which notes as the average height of the Estepona specimens. The average height of the shells from Arediou is 9 mm and was calculated from the 27 most complete shells out of 55, without including the 3 very small juveniles. The presence of *Olivella clanzigi* in Cyprus is of geographical importance as this species has not been recorded from the eastern part of the Mediterranean Pliocene before. Of special interest are the small juvenile specimens (Pl. 1, Fig. 6a-c), which were not illustrated or stated in Lozouet (1992) or Landau *et al.* (2006), and 1 specimen with preserved pattern (Pl. 1: Fig. 5a-b).

Superfamily: Conoidea J. Fleming, 1822

Family: Mangeliidae P. Fischer, 1883

Genus: *Kyllinia* Garilli & Galletti, 2007

Type species: *Kyllinia parentalis*

Garilli & Galletti, 2007

Kyllinia parentalis Garilli & Galletti, 2007

Pl. 2, Figs 1-2

Locality: Deftera village, Nicosia, Cyprus.

Material examined: 2 complete shells.

Remarks: This species was first described by Garilli and Galletti (2007) based on 3 shells from the Pliocene of northern Italy and northwestern Peloponnesus, Greece. The specimens collected by Deftera were found in sediments of Nicosia Formation of Pliocene age, in blue muddy sediment with cladocora with numerous other molluscan species. This sediment is probably very similar to the one where paratype 1 of *K. parentalis* was found in the Castell' Arquato Formation. The only living species of this genus is *Kyllinia marchadi* (Knudsen, 1956) occurring in the Atlantic Ocean off Senegal, Guinea and Angola. The authors also suggest that this species should be considered a thermophilic climatic marker.

Family: Horaiclavidae Bouchet, Kantor, Sysoev &

Puillandre, 2011

Genus: *Anacithara* Hedley, 1922

Type species: *Anacithara naufraga* (Hedley, 1909)

***Anacithara akisi* sp. nov.**

Plate 2, Figs 3-7

Type material: Holotype (Pl. 2, Figs 3a-d): 4 mm, RBINS (IRSNB 7695). **Paratype 1** (Pl. 2 Figs 4a-c): 4 mm, DK; **Paratype 2** (Pl. 2, Figs 5a-c): 4mm, RBINS (IRSNB 7696).

Type Locality: Arediou village, Nicosia, Cyprus.

Material examined: 4 specimens

Description: Shell very small, ovate-claviform, almost 2.3 times longer than wide. The protoconch is smooth, paucispiral, dome-shaped and somewhat globose-shaped, slightly cyrtconic and consists of about 1.25 whorls (according to the method as described by Verduin, 1977). Teleconch transition not very evident due to the less preserved sculpture on apical whorls of the specimens and marked by a very faint axial rib. Teleconch of about 4 slightly convex whorls separated by a slightly crenulated suture, caused by the formation of the axial ribs. Suture slightly swollen like a very thin subsutural cord. Sculpture composed of 8-9 very faint axial ribs which tend to fade away on the second half of the last whorl. Spiral sculpture of numerous equidistant spiral threads, more visible under magnification. Anal sinus shallow with weak parietal callus pad on the left of the aperture and a thicker-curved parietal callus on the posterior angle of the aperture. Aperture elongate, somewhat rhomboidal and oblique, with a thick-variced

outer lip ending in a short canal

Etymology: Named after my father, Akis Kolokotronis, for his help and support.

Remarks: The new species is hereby placed in the genus *Anacithara* instead of *Haedropleura* because it misses the strong axial sculpture and the axial ribs from suture to suture, mentioned in Horro *et al.* (2021). Moreover, the paucispiral protoconch is one of the typical characteristics of the genus. *A. akisi* sp. nov. has some typical characteristics of this genus (notes on the genus are mentioned in Kilburn, 1994), including the blunt (and in this case more globose) paucispiral protoconch, slightly crenulating suture, somewhat claviform shape, spiral threads on sculpture, outer lip with a strong varix (depending on the level of growth) and a relatively shallow anal sinus.

This species has some similarities with the Recent South African species *Anacithara simplex* (Turton, 1932) and *Anacithara angulicostata* Kilburn, 1994 and the Tropical Indo-West Pacific species *Anacithara themeropsis* (Melvill & Standen, 1896).

The new species differs from *A. simplex* in having a more robust and a bit more elevated protoconch. Spiral sculpture is very faint in comparison with the evident sculpture of *A. simplex*. The suture is less undulating and the lip is thicker.

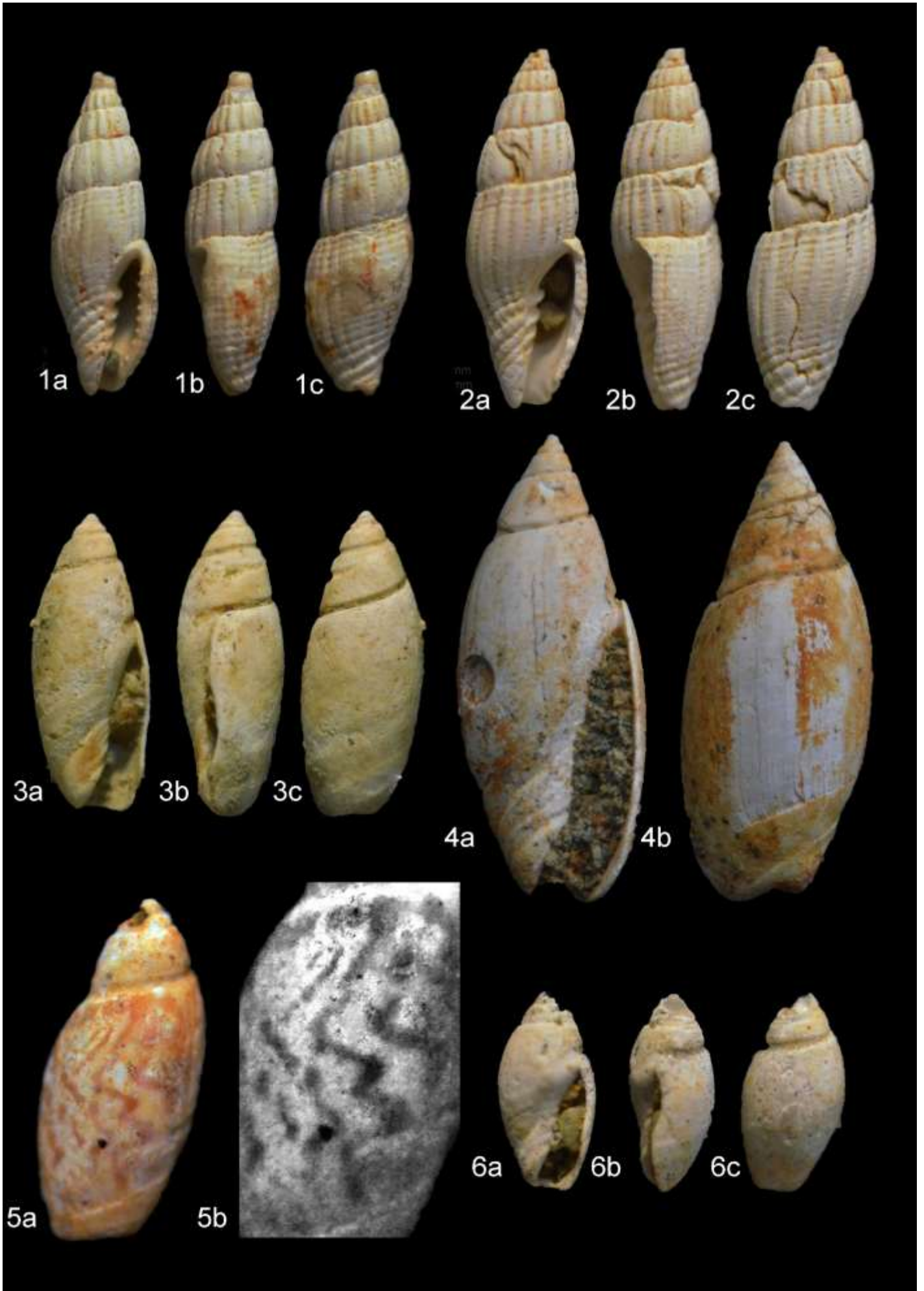
A. angulicostata differs from this species by a less globose protoconch, more angular and convex whorls and more evident spiral and axial sculpture.

A. themeropsis differs from this species by the more convex whorls, less globose protoconch and more convex and thick lip.

No records of *Anacithara* species in the Mediterranean Pliocene or Miocene could be found and its presence could be of importance in the biogeography of this genus. The only 2 species that have been recorded in the nearest countries, but of a millions of years difference, are *A. simplex*, which is recorded in the Museums Victoria Collections (Specimen P 117977) from the Lutetian stage of France as *Drillia simplex* Turton, 1932 and *Donovania miocaenica* Boettger, 1902 from the Middle Miocene of Romania. This species was later placed in the genus *Haedropleura* Bucquoy, Dautzenberg and Dollfus, 1883, but Landau *et al.* (2015) mention that it may be closer to the horaiclavid *Anacithara*, which is still uncertain. Other fossils occurrences of this genus are from the Miocene of New Zealand and Pleistocene of Japan.

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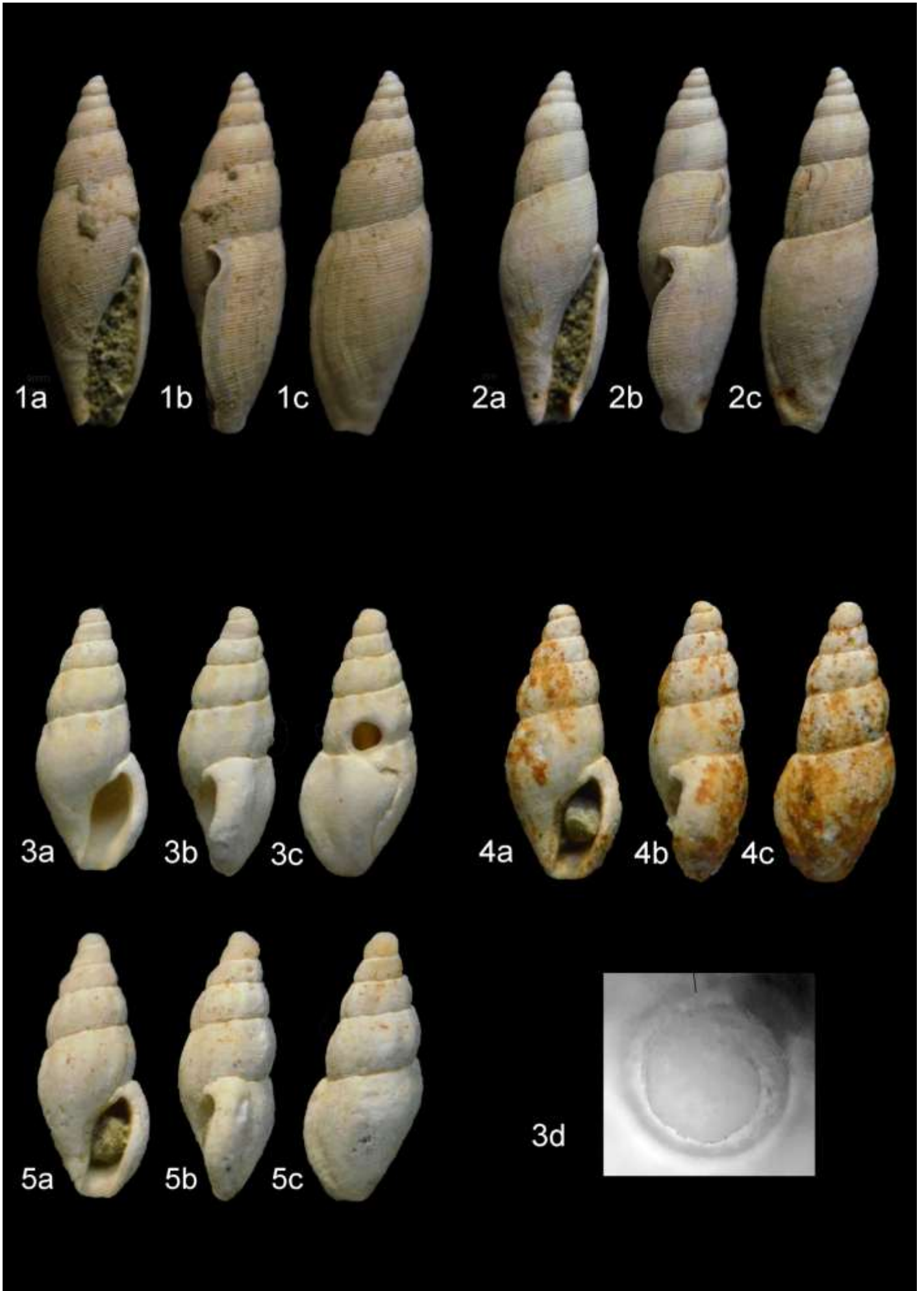


Plate 1:**1-2: *Thala obsoleta*** (Brocchi, 1814)

Arediou, Nicosia, Cyprus. DK.

1: 5.8 mm.**2:** 7.3 mm.**3-6: *Olivella clanzigi*** Lozouet, 1992 (7mm)

Arediou, Nicosia, Cyprus. DK.

3: 7 mm.**4:** 14.4 mm.**5:** 7.8 mm. Abapertural and pattern close-up.**6:** 2.4 mm. Juvenile.**Plate 2:****1-2: *Kyllinia parentalis*** Garilli & Galletti, 2007

Deftera, Nicosia, Cyprus. DK.

1: 6.4 mm.**2:** 6.5 mm.**3-5: *Anacithara akisi*** sp. nov.

Arediou, Nicosia, Cyprus.

3: Holotype. 4mm. RBINS: IRSNB 7695.**4:** Paratype 1. 4 mm. DK.**5:** Paratype 2.4 mm. RBINS: IRSNB 7696.

Description of a new *Famelica* species (Gastropoda: Raphitomidae) from the Philippines

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Keywords: Gastropoda, Turridae, Raphitomidae, *Vepracula*, *Famelica*, *Famelica babelica* sp. nov., Philippines.

Family: Raphitomidae Bellardi, 1875

Genus: *Famelica* Bouchet & Warén, 1980

Type species: *Pleurotomella catharinae* Verrill & Smith, 1884 (original designation by Bouchet and Warén, 1980).

Abstract: *Famelica babelica* sp. nov. is described from Central Philippines and is compared with *Famelica polyacantha* (Stahlschmidt, Chino & Kilburn, 2012).

Famelica babelica sp. nov.

Figs 1-8

Introduction: When introducing *Vepracula polyacantha*, the authors already mentioned that not all characteristics of the new species are typical of the genus *Vepracula* and, therefore, only tentatively referred to this genus (Stahlschmidt *et al.*, 2012). A recently published molecular phylogeny demonstrated that *Vepracula polyacantha* belongs to the genus *Famelica* Bouchet & Warén, 1980, even though the species exhibits some shell features that are somewhat divergent from typical *Famelica* species (Criscione *et al.*, 2021). In the present paper, a closely related species is described as *Famelica babelica* sp. nov. from Central Philippines.

Type material: Holotype: MNHN IM-2000-30438, height x width 6.2 x 2.2 mm. **Paratypes: Paratype 1:** NSMT Mo-79156, 6.3 mm; **Paratype 2:** MC 6.2 mm; **Paratype 3:** MC 4.8 mm; **Paratype 4:** PS-672, 5.3 mm; **Paratype 5:** GTP 4.5 mm; **Paratype 6:** PS-672, 5.5 mm; **Paratype 7:** MSF, 6.8 mm

All type material from type locality.

Type locality: Philippines, Mactan Island, Olango Channel, 180-220 m.

Abbreviations:

MNHN: Museum national d'Histoire naturelle, Paris, France

MSF: Molluscan Science Foundation, Owings Mills, USA

NSMT: National Museum of Nature and Science, Tokyo, Japan

GTP: Collection Guido T. Poppe, Mactan, Philippines

MC: Collection Mitsuo Chino, Kawasaki, Japan

PS: Collection Peter Stahlschmidt, Rohrbach, Germany

Distribution: So far only known from the type locality.

Description: Shell narrowly fusiform, fragile, with a highly turreted spire and an inflated body whorl. Small: between 5.0 and 7.6 mm in length, with the ratio of total breadth and total length ca. 0.41. Axial ribs are lacking. Spiral cords high and compressed, with broad-based, flat spines. Protoconch approximately two and a half whorls, the first protoconch was lost in all examined specimens. The second and the third protoconch whorls are angulate with about 25 thin, oblique and granular axial small ribs, at midwhorl. The teleoconch has about 5 convex whorls. One carinated spiral cord at midwhorl of the first to third

Systematics:

Superfamily: Conoidea Fleming, 1822

teleoconch whorl, a second carinated spiral cord emerges between the sutures of the first and the third whorl, and a third carinated spiral cord on the suture of the third to last whorl, progressively increasing in strength. The last whorl with two eminent carinated spiral cords at mid-whorl. About 16 narrow hollow triangular spines on the major spiral ribs. The distances between keel spiral cords on each whorl is almost the same. Between the first and second carinated spiral cord, shell outline apically straight, steep, about 70° angle between suture and first keel spiral cord, overhanging about 45° angle below lower carinated spiral cord. Shell surface smooth, micro-sculpture lacking. Sinus zone indistinct, only recognisable through very fine concave microscopic axial striae. Suture indistinct. Aperture large, terminating in a long, narrow and twisted anterior canal. Outer lip between carinated spiral cords apically straight, slightly concave, fragile, with a moderately deep U-shaped anal sinus. Columella smooth and glossy.

Fresh shells are glossy and have a glassy appearance. The background-colour is translucent golden-orange.

Radula and animal unknown at present.

Remarks: *Famelica babelica* sp. nov. differs from *Famelica polyacantha* (Stahlschmidt, Chino & Kilburn, 2012) (Figs. 9-11) by having only one carinated spiral cord on the early teleoconch whorls and two carinated spiral cords on the last whorl, while *F. polyacantha* has two carinated spiral cords on the early teleoconch whorls and three on a more convex last whorl. Moreover, the new species is golden-orange to greyish white coloured, while *F. polyacantha* has a reddish-brown colouration.

These two species (*F. polyacantha* and *F. babelica* sp. nov.) compose a small group in the genus by having the common characteristic of eminent carinated spiral cords.

Thatcheriasyrinx orientis (Melvill, 1904) (Fig. 12) may look similar due to its spiny sculpture. However, it differs by the pagoda-shaped and strongly carinated shell shape.

Etymology: From the Hebrew *babelica* referring to the biblical tower of Babel, the building with stepped sides and apically straight outline, imaging resemblance to the carinated, spiral cords.

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Plate 1

1-4: *Famelica babelica* sp. nov.

1-4: Holotype, MNHN IM- 2000-30438 6.2 mm.
Philippines, Mactan Is., 180-220 m;

5-8: Paratype 1, NSMT Mo-79156, 6.3 mm.
Philippines, Mactan Is., 180-220 m,

Plate 2

9-11: *Famelica polyacantha*

(Stahlschmidt, Chino & Kilburn, 2012)

9-10: Paratype 1, MNHN 23312 10.0mm
Philippines, Mactan Is., 180-220 m,

11: early whorls : MC Philippines, Mactan Is.,
180-220 m.

12: *Thatcheriasyrinx orientis* (Melvill, 1904)

Holotype NHMUK 1904.7.29.26-27, Gulf of Oman,
24°58'N, 56°54'E, 156 fath., (copyright of the
Natural History Museum of London).



1 - 4



5 - 8



9



10



11



12

New Borsoniidae from the Central Philippines

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Introduction: In 2011, an article of major importance when it comes to Conoidea appeared: "A New operational classification of the Conoidea (Gastropoda)". It was signed by 4 authors: P. Bouchet, Y.I. Kantor, A. Sysoev and N. Puillandre. In this article, we will further refer to this article as "Bouchet & al. (2011)".

With what scientists understand as Conoidea, nature lovers and collectors of marine shells mean "Turridae", at present to be distinguished from Terebridae and the Conidae, which are also part of Conoidea.

In Bouchet & al., 2011 a brief overview of the history of Conoidea is given. A first period of particular interest in the group by authors was between 1853 and 1896. A second period with quite some publications was between 1942 and 1971, and since the publication of Bouchet & al., 2011 many scientists and collectors have enthusiastically published on the group.

In 1993, Taylor, Kantor and Sysoev divided Conoidea into 6 families, and as publications followed and molecular studies stepped in with a new molecular phylogeny by Puillandre & al., also in 2011, we arrive at the present day situation where Conoidea do not count any fewer than 17 families. In alphabetical order: Borsoniidae, Bouchetspiridae, Clathurellidae, Clavatulidae, Cochlespiridae, Conidae, Conorbidae, Drilliidae, Fusiturridae, Horaiclavidae, Mangeliidae, Marshallenidae, Mitromorphidae, Pseudomelatomidae, Raphitomidae, Terebridae and Turridae.

Bouchet & al. (2011) continued their article with a comparison of their classification with former classifications (Taylor & al., 1993, Bouchet & Rocroi, 2005, Tucker & Tenorio, 2009). After an extensive "Material and Methods", they went on with a detailed description of each family in Conoidea, with lists of the genera and their synonyms. Many samples were figured and many radulae were shown. At the end, a page with sample protoconches for each family was given and Appendix I refers all genera to their respective family. Appendix 2 lists all family and subfamily names in Conoidea. Especially Appendix I is of great use for

curators of shell collections and all working with materials concerned with this group of molluscs.

The Philippines has a tremendous rich fauna and during the past two decades we have acquired huge quantities of Conoidea: much of which remain not classified as yet. We showed the ones that are easy to identify in the Philippine Marine Shells book series, but we have thousands of problematic specimens "for later study". We have collaborated with other authors and described a number of them ourselves. These sparse efforts have already resulted in the description of 77 new species in Conoidea, mainly in the journal *Visaya*. We continue the tradition to further document this group of molluscs here.

Methods for the notes on Conoidea families:

Approaching the classification of thousands of the former Turridae is a delicate affair. To get a decent understanding of the 342 valid genera we use, we researched a figure of the type species of each genus, as found in literature, online or in our extensive photo collections, and put these in a format we are able to browse by computer. Yet, we have not found more than a dozen type figures of genera as yet, and in the future authors are strongly advised to figure these instead of producing listings without a visual comprehension of what is meant. At present, the confusion in the Conoidea is too big to work with names only. We then classified our not yet identified material as well as possible based on the genera found and used the extensive literature of the library in Conchology, Inc. for identification. Problems are regularly encountered and we will discuss these as the descriptions and the documentation of species goes on.

Descriptions: The following new Borsoniidae are described here: *Bathytoma klinkeni* sp. nov., *Drilliola barnsi* sp. nov., *Drilliola exquisita* sp. nov., *Drilliola labradorae* sp. nov., *Drilliola mactanensis* sp. nov., *Drilliola multispiralis* sp. nov., *Microdrillia engelsei* sp. nov., *Microdrillia papavasili* sp. nov., *Microdrillia peculiaris* sp. nov.

Systematics :

Family: Borsoniidae A. Bellardi, 1875

Genus: *Bathytoma* G.F. Harris & Burrows, 1891

Information on the genus: The genus *Bathytoma* has enjoyed a lot of attention in the latest years. It is widespread in the Indo-Pacific: from East Africa all the way to the Philippines and south to Australia. They are large predatory snails living in relatively deep water, where they compete with an even larger number of members of the Conidae family, with which they share the same bottoms.

Several genera and/or subgenera have been put in synonymy: *Micantapex*, *Parabathytoma* and *Riuguhdrillia*.

At present, the genus *Bathytoma* looks as follows:
agnata Hedley & Petterd, 1906 - Australia, New South Wales.

arbucklei Kilburn, 1986 - South Africa, off Transkei.

atractoides (R.B. Watson, 1881) - Philippines, dredged by Challenger at 375 fathoms.

badifasciata Puillandre, Sysoev & al., 2010 - Solomon Islands.

belaeformis (G.B. Sowerby III, 1903) - South Africa.

bitorquata (E. von Martens, 1901) - East Africa.

boholica Parth, 1994 - Philippines, Bohol.

carnicolor Puillandre, Sysoev & al., 2010 - Solomon Islands.

consors Puillandre, Sysoev & al., 2010 - Solomon Islands.

cranaos Puillandre, Sysoev & al., 2010 - Solomon Islands.

engonia (R.B. Watson, 1881) - Japan.

episoma Puillandre, Sysoev & al., 2010 - Philippines.

fissa (E. von Martens, 1901) - East Africa.

formosensis Vera-Pelaez, 2004 - Taiwan.

gabrielae Bozzetti, 2006 - Mozambique.

gordonlarki Tucker & Olivera, 2011 - Philippines.

hecatorguia (Verco, 1907) - Australia.

hedlandensis Tippett & Kosuge, 1994 - Australia.

helenae Kilburn, 1974 - South Africa.

lacertosus (Hedley, 1922) - Australia.

luehdorfi (Lischke, 1872) - Japan.

mitrella (Dall, 1881) - Mexico.

murdochi Finlay, 1930 - New Zealand.

neocaledonica Puillandre, Sysoev & al., 2010 - New Caledonia.

netrion Puillandre, Sysoev & al., 2010 - Indonesia.

oldhami (E.A. Smith, 1899) - India.

paratractoides Puillandre, Sysoev & al., 2010 - Solomon Islands.

parengonia (Dell, 1856) - New Zealand.

prodicia Kilburn, 1986 - Mozambique.

profundis (Laserson, 1954) - Australia.

punicea Puillandre, Sysoev & al., 2010 - Solomon Islands.

regnans Melvill, 1918 - Bay of Bengal.

solomonensis Puillandre, Sysoev & al., 2010 - Solomon Islands.

somalica Ardovini, 2015 - Somalia.

stenos Puillandre, Sysoev & al., 2010 - Philippines.

striatotuberculata (Yokoyama, 1928) - Japan.

tippetti Vera-Pelaez, 2004 - Philippines.

tuckeri Vera-Pelaez, 2004 - Taiwan.

viabrunnea (Dall, 1889) - Florida.

virgo (Okutani, 1966) - Japan.

visagei Kilburn, 1973 - Mozambique.

To this list, MolluscaBase adds 26 more known fossil species.

***Bathytoma klinkeni* sp. nov.**

Plate 1



Type material: Holotype: 75.9 mm. Coll. MNHN, Paris. **Paratypes: Paratype 1:** 80 mm. Coll. G.T. Poppe; **Paratype 2:** 73.5 mm. Coll. G.T. Poppe; **Paratype 3:** 76.3 mm. Coll. G.T. Poppe.

All type material from "Taiwan. Offshore 300-400 m."

Type locality: Taiwan.

Distribution and habitat: Only known from "offshore Taiwan". The material was purchased from a Taiwanese shell dealer who sold lots of deep water material from "offshore Taiwan" with only depth information during a Bangkok shell show in 2019.

Description: Size of the adult shells between 73.5 and 80 mm in length. Shape elongate, with a swollen body whorl, the broadest part of the shell about half way between the apex and the siphonal canal. Protoconch broken off, the last part of the protoconch still visible, not covered with intritacalx. The rest of the shell entirely covered with a thin intritacalx, except the inside of the aperture and the columellar callus, which are both smooth and glossy. All the whorls start on top with a slightly globose zone, almost vertical when the shell is kept upwards, followed by the second part which is strongly convex. The shell is covered with a strong sculpture of axial lines. Especially on the upper whorls these axial lines are curved in opposite directions: the ones on the small vertical zone turn in an opposite direction compared to the ones on the larger lower and globose part of the whorls. This axial sculpture is crossed by spiral lines along the entire shell. These spiral lines become dominant as the shell grows and are very important on the lower half of the body whorl. The body whorl is large, about two thirds of the total shell length. The sinus on the upper part of the mouth is broad and important. The siphonal canal is particularly wide when compared to other members of the genus. Inside of aperture light orange.

Comparison and remarks: All *Bathytoma* have an "almost" identical shape. In comparing the new species, large parts of the genus can be excluded from any possible confusion with *B. klinkeni* sp. nov.: all the ones with a colour pattern (in the style of *B. badifasciata* and *B. viabrunnea*); all the ones with knobs or a carena on the shoulder (in the style of *B. agnata* and *B. engonia*); all the ones with a pronounced sculpture along the shell (in the style of *B. cranaos*, *B. gabriellae*) and all the ones with a smooth shell (in the style of *B. luhdorfi*, *B. visagei*) are easily distinguished.

B. klinkeni sp. nov. differs from all known material by the very broad shell with a broad and open siphonal canal. This is combined with particular conchological characteristics, such as the plicae in the general outline, a few mm below the suture. This particular subsutural structure is only seen in this new species.

In literature, some shells close to *B. klinkeni* sp. nov. have been figured: figure nr. 9 in Puillandre & al. (2010) shows an Indonesian shell with a broad shape. However, in this shell, the zone below the suture is well divided into two different "canals" and the aperture is very white. It is definitely not a *B. attractoides* as it was called in the publication.

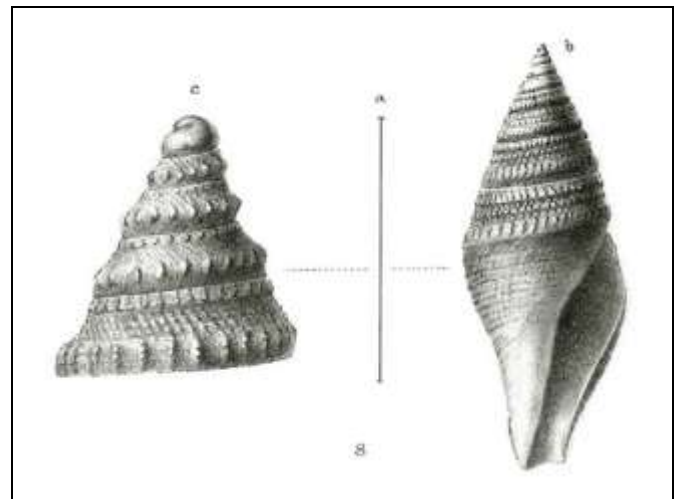
A shell with an almost similar subsutural structure as seen in *B. klinkeni* sp. nov. is shown on the website of the MNHN: the holotype of *B. episoma*. However, *B. episoma* is a much slenderer species with a very narrow

and deep siphonal canal.

B. netrion from the Tanimbar Islands also has a heavy and stocky shell in shape, much like *B. klinkeni* sp. nov., but the outline is different, the spire lower, and *B. klinkeni* sp. nov. does not have the periphery with small knobs as seen in that species. Moreover, the aperture in *B. netrion* is pure white and the siphonal canal is narrow.

Etymology: We are honoured to name this species after the late Klaas Klinken, shell collector from Enschede, the Netherlands, who passed away in 2016. Before that he and his family arranged that the entire collection would be handled by Conchology, Inc., and in this way Klaas' large and very valuable collection was almost entirely recorded, with photographs and information on each specimen. In this way, it is well preserved for the future and research.

Remarks: In the hundreds of figured *Bathytoma* in literature, we have only found one figured specimen of *B. klinkeni* sp. nov.: Zongh Bosson (2006) in the *Pei-Yo* magazine, Vol. 32, fig. 65a. It was grouped in a plate with 3 other species and wrongly called *B. attractoides*. The name *B. attractoides* in literature is hard to interpret, as so many different species have been figured as "*attractoides*". We here refigure the drawing in H. Watson (1886) in his report on the Challenger shells. It is the holotype and was dredged in the Philippines at a depth of "375 fathoms" - or 685 metres. It is definitely a young *Bathytoma*, not fully adult, but with a remarkable sculpture.



The holotype of *B. attractoides*, after R.B. Watson (1881)

Most *Bathytoma* material from the Philippines taken by local fishermen is from much shallower depths as they virtually never fish deeper than 500 m. To our knowledge, only the American Albatros expedition material and the multiple dredgings by the Paris Museum people produced deeper material. As such, during this

study we noticed that the shell we figured as *B. atractoides* from offshore Taipei, Taiwan in PMM 5 (2017) is not that species. The best recent figure of a real *B. atractoides* is possibly fig. 84 in Sysoev & Bouchet (2001).

Genus: *Drilliola* Cossmann, 1903

Information on the genus: At the time of writing, the genus *Drilliola* has 3 recent species in WoRMS. MolluscaBase adds 17 fossil species to this. The recent species are:

Drilliola antarctica Kantor, Harasewych & Puillandre, 2016

Drilliola emendata (Monterosato, 1872) Type of the genus

Drilliola loprestiana (Calcare, 1841)

= *comatotropis* (Dall, 1881)

= *pulchella* (Verrill, 1880)

We here extend the genus with a series of Indo-Pacific species that have conchological features very close to the recent Atlantic and Antarctic material.

D. loprestiana lives on both sides of the Atlantic and the name *D. comatotropis* was mainly used for the American members of that species. Rolan (2011) used the name *D. pulchella* for Canary Island specimens of *D. loprestiana*.

The type species of *Drilliola* is *Taranis emendata* Monterosato, 1872. This species, now called *Drilliola emendata*, looks like the sister species of *Drilliola loprestiana* from the same waters, but the protoconch is notoriously different. It is broad and flattened in *D. emendata*, yet pointed and sculptured in *D. loprestiana*. So, apparently a great deal of variation is possible in the protoconches of the genus *Drilliola* as understood today.

In literature we noticed *Drilliola pruina* (Watson, 1881), which we think is not a real *Drilliola*, but possibly a member of the genus *Microdrillia*. See Bouchet & Waren (1980). *Drilliola pruina* (Watson, 1881) as figured by E. F. Garcia (2013) does not correspond very well to the Watson (1886) drawing and is possibly an undescribed species. The Bouchet & Waren (1980) shell perfectly fits the Watson (1886) drawing.

When looking at the genus *Tomopleura* at present, we notice that a number of species shown have the features of *Drilliola*, more than the features of the type species of that genus, which is *Tomopleura nivea* (Philippi, 1851). It is with some reserve that we move the former *Tomopleura reevii* (C. B. Adams, 1850) and the newly described species here to *Drilliola*: the study of protoconches and other characteristics may lead to a later split-up of *Drilliola* as presented here.

Drilliola barnsi sp. nov.

Plate 2



Type material: Holotype: 7.8 mm, Coll. NMP, Manila. Philippines. Mactan Island. Punta Engano. 150-180 m.

Paratypes: Paratype 1: 8.3 mm, Coll. MNHN, Paris. Philippines. Mactan Island. Punta Engano. 150-250 m;

Paratype 2: 8.8 mm, Coll. Guido T. Poppe. Philippines. Mactan Island. Punta Engano. 100-250 m. **Paratype 3:** 13.6 mm, Coll. Guido T. Poppe. Philippines. Mactan Island. Coral Point. 100-250 m.

Type locality: Philippines. Mactan Island. Punta Engano. 150-250 m.

Disribution and habitat: All known shells were found at a depth between 150 and 250 m, offshore Punta Engano, Mactan Island, the Philippines. The bottom in this area is a mixture of mud and gravel.

Description: Size of the adult shells known between 7.8 and 8.3 mm in length. Shell shape long and slender. In the holotype, the upper tip of the protoconch is missing, but two whorls remain, without particular sculpture. The transition to the teleoconch is hardly visible, and so is the suture, which is particularly hard to detect, even under considerable enlargements. All upper whorls bear a sculpture of two strong spiral ribs. The lower spiral rib is stronger than the upper one. From the third whorl on, a fine sculpture of oblique numerous and evenly spaced axial lines appears between these major spiral ribs. There are about 6 teleoconch whorls. The body whorl is large and covers almost one third of the total shell length. The

lower part of this body whorl has a sculpture of 7 spiral ribs from the big dominant spiral rib down to the end of the siphonal canal. In between these spiral ribs, there are numerous small and tiny oblique axial ribs, in an opposite direction of the ones on the upper part of the body whorl. The aperture is small, about one fifth of the total shell length, the external lip thin, the siphonal canal wide and broad. The entire shell is porcelaneous in structure, semi-translucent, yet strongly built.

Comparison and remarks: We here compare *D. barnsi* sp. nov. with other *Drilliola* living in the same area.

The species differs from *Drilliola mactanensis* sp. nov. by its slightly larger size, but especially by the slenderer outline and the relatively smaller aperture when compared to *D. mactanensis* sp. nov. On the second last whorl, *D. mactanensis* sp. nov. has only one dominant big spiral rib, while there are two in *D. barnsi* sp. nov. The big spiral ribs in *D. barnsi* sp. nov. are sharper and not as rounded as in *D. mactanensis* sp. nov. We further refer to the photos in this article for the very obvious differences between these two *Drilliola*.

The species is generally slightly smaller compared to *Drilliola labradorae* sp. nov. and is pure white: it does not have the bluish shine as very often seen in *D. labradorae* sp. nov. On top of that, the shells of *D. labradorae* sp. nov. have a slightly convex outline, while the spire in *D. barnsi* sp. nov. is straight. The aperture in *D. barnsi* sp. nov. is also smaller.

Drilliola exquisita sp. nov. can be distinguished at once by the broad shell and the strong yellow colour, especially below the suture.

Drilliola multispiralis sp. nov. has more spiral ribs and a much bigger last whorl with a bigger and narrower aperture and a sharper spire.

D. reevii has a strongly coloured top of the spiral ribs, which will distinguish that species at once.

Etymology: The name honours Jeremy Barns, Director-General of the National Museum of the Philippines. Under Jeremy Barns, and with the collaboration of Ana Maria Theresa Labrador, PhD, Deputy Director-General for Museums, the aforementioned National Museum underwent a considerable transformation. At present the museum knows a strong and well-deserved revival in Manila and its 15 regional museums throughout the country. A 16th one, the National Museum Central Visayas in Cebu, is expected to open in late 2022.

Drilliola exquisita sp. nov.

Plate 2



Type material: Holotype 15 mm. Coll. NMP, Manila, Philippines. Mactan Island. Maribago. 80-120 m. **Paratypes: Paratype 1:** 12.7 mm. Coll. MNHN, Paris. Philippines. Mactan Island. Malingin. 100 m; **Paratype 2:** 15 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. 100-150 m; **Paratype 3:** 14.8 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. Malingin. 100 m; **Paratype 4:** 14.9 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. Malingin. 80-120 m; **Paratype 5:** 14 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. Malingin. 100 m; **Paratype 6:** 14.4 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. Malingin. 150 m; **Paratype 7:** 15.7 mm. Coll. Guido T. Poppe. Philippines. Aliguay Island. 150-200 m; **Paratype 8:** 15.7 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. Punta Engano. 180-250 m.

Type locality: Philippines. Mactan Island.

Distribution and habitat: We have only got material from Mactan Island and Aliguay up till now. All shells come from between 80 and 250 m deep.

Description: Size of the adult shells known between 12.7 and 15.7 mm in length. The outline of the shells is elongate and slender, with a very high spire. The colour is a mixture of pale brown and white. The protoconch is quite large and consists of two whorls. It is entirely translucent and swollen, at one moment broader than the base where it changes in the first teleoconch whorl. These teleoconch whorls, which number not fewer than seven,

have a complicate shape and sculpture. Each whorl is dominated by two important spiral cords. These spiral cords are rounded, not sharp and last until the body whorl. The 4 first whorls are entirely white, the later whorls are pale brown on their lower half. The sutures are shallow and hardly visible, even under enlargement. We here describe the sculpture of the penultimate whorl, which has one white spiral cord more than the upper whorls. This third important spiral cord only appears there as it is sunken below the next whorl on the upper whorls. The structure of this penultimate whorl consists (from top down to the last whorl) of thin bands of zones covered with micro-pearls/ beads. Then the 3 important spiral cords appear. Below the suture there is a thin band of brown beads, then a smooth, rounded, brown spiral cord, then a double band of brown beads, then a double row of white beads, a little raised, followed by a smooth, rounded, white spiral cord, a thin band of beads, a third, yet smaller smooth and rounded spiral cord and again a thin band of beads. All white. The body whorl is large and counts for about a third of the total shell length. It is covered by 11 whitish spiral cords, with darker, brownish beads set in spiral rows in between the spiral cords. The outer lip is thin, the inside of the aperture white, but the inside of the columellar side has the same colours as the outer shell. Siphonal canal thin. Inside the white callus of the aperture, one can see 6 strong, raised spiral ribs, which apparently follow the spiral ribs on the outside of the shell.

Comparison and remarks: The combination of a very "broad" shell with a cream colour and a dark ochre-coloured subsutural band will readily distinguish *D. exquisita* sp. nov. from all other *Drilliola* from the region such as *D. barnsi* sp. nov., *D. labradorae* sp. nov., *D. mactanensis* sp. nov., *D. multispiralis* sp. nov. and *D. reevii* (C.B. Adams, 1850).

Etymology: The name *exquisita* comes from Latin and means "refined". This species has indeed got a refined sculpture and a delicate and refined coloration.

Drilliola labradorae sp. nov.
Plate 3

Type material: Holotype: 8.6 mm. Coll. NMP, Manila. Philippines. Cebu. Liloan. 80-150 m. **Paratypes: Paratype 1:** 12.1 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. 180-250 m; **Paratype 2:** 9.8 mm. Coll. MNHN, Paris. Philippines. Cebu. Liloan. 80-150 m; **Paratype 3:** 11.7 mm. Coll. Guido T. Poppe. Philippines. Aliguay Island. 80-150 m; **Paratype 4:** 11.2 mm. Coll. Guido T. Poppe. Philippines. Aliguay Island. 80-150 m;

Paratype 5: 11.3 mm. Coll. Guido T. Poppe. Philippines. Aliguay Island. 80-150 m; **Paratype 6:** 9.9 mm. Coll. Guido T. Poppe. Philippines. Mactan Island. Punta Engano. 200-270 m; **Paratype 7:** 11.8 mm. Coll. Guido T. Poppe. Philippines. Cebu. Liloan. 80-150 m; **Paratype 8:** 9 mm. Coll. Guido T. Poppe. Philippines. Cebu. Liloan. 180-250 m; **Paratype 9:** 9.2 mm. Coll. Guido T. Poppe. Philippines. Cebu. Liloan. 180-250 m; **Paratypes 10-16:** All from the central Philippines, Cebu & Mactan Islands. Coll. Guido T. Poppe.



Type locality: Cebu. Liloan.

Distribution and habitat: Known range at present limited to the central Philippines: we got material from Cebu, Mactan Island and Aliguay Island. Known from depths between 80 and 250 m.

Description: Size of the adult shells known between 8.6 and 12.1 mm in length. The protoconch of this species is particularly large, consisting of 2.5 entirely translucent whorls, followed by a whorl covered with "comma"-shaped waves, after which the first of the 6 following whorls appears. These whorls all have two strong spiral cords, with very small axial oblique, raised lines in between. These axial lines change direction at several occasions, forming a fine network pleasing to the eye. On the very large body whorl, which is over one third of the entire shell length, the two spiral cords continue on the upper part, and there the complicate axial sculpture becomes more visible. The lower half of the body whorl is covered by 6 spiral cords, strongly declining in strength when approaching the siphonal canal. This siphonal canal has a zone covered with three further very oblique spiral cords on the columellar side. The axial sculpture between

the spiral cords continues down to the end. Outer lip sharp, aperture quite narrow with the outer spiral cords shining through on the inside.

The coloration of the holotype is entirely white, but there is a hardly visible trace of brown on top of some of the major spiral cords.

Comparison and remarks: We here compare *D. labradorae* sp. nov. with other *Drilliola* living in the same area.

The species differs from *D. mactanensis* sp. nov. by its slightly purplish and not pure white coloration. The shell is more solid and has thicker and more rounded ribs. The spire is higher and the outline of the shell slenderer.

The species differs from *D. barnsi* sp. nov. through the same characteristics

It differs from *D. exquisita* sp. nov. by the slenderer shell and the coloration: in *D. exquisita* sp. nov. the shell is cream with a thick subsutural ochre band.

D. multispiralis sp. nov. has way more spiral ribs and is more whitish, the siphonal canal slenderer.

D. reevii has the tops of the spiral ribs strongly coloured and the shell is of a thinner structure with a smaller aperture.

We want to point out that very freshly fished living *D. labradorae* sp. nov. have a quite dark purplish coloration. The shells fade fast after drying and being put in collections, but a faint purplish tinge remains for a long time. Afterwards even this purplish tinge turns into a faint brown.

Etymology: The name honours Ana Maria Theresa Labrador, PhD, Deputy Director-General for Museums, the National Museum of the Philippines. Under her leadership, the aforementioned National Museum underwent a considerable transformation. She reinvigorated much of the museum and made it accessible in collaboration with Jeremy Barns, the Director-General. At present the museum knows a strong and well-deserved revival in Manila and its 15 regional museums throughout the country. A 16th one, the National Museum Central Visayas in Cebu, is anticipated to open in late 2022.

Drilliola mactanensis sp. nov.

Plate 3

Type material: Holotype: 7.6 mm. Coll. NMP, Manila.

Philippines. Mactan Island. Punta Engano. Coral Point. 240 m. **Paratypes: Paratype 1** 6.5 mm. Coll. G.T. Poppe. Philippines. Mactan Island. Punta Engano. 180-230 m; **Paratype 2:** 6.4 mm. Coll. MNHN, Paris. Philippines. Mactan Island. Punta Engano. 180-230 m; **Paratypes 3 to 44:** Coll. G.T. Poppe and Conchology, Inc.



Type locality: Mactan Island. Punta Engano.

Distribution and habitat: All known material comes from the channel between Mactan and Olango Islands, except one shell that was dredged in Mindanao, Surigao. The latter was most likely taken between Lipata and Basul Island, on bottoms between 80 and 100 m.

Drilliola mactanensis sp. nov. lives relatively deep: only 3 shells are known that were collected between 60 and 80 m in front of Coral Point, Punta Engano, Mactan Island and one shell, the Surigao specimen, was collected between 80 and 100 m. Most of the material comes from depths between 180 and 250 m. There are a few exceptions from deeper waters: paratype 35 is from a place called Amisa, and was taken at 300 m. Paratype 44 comes from 400 m and paratype 14 was caught offshore Tingo point, the northern point of Olango Island, at 450m.

Description: Size of the adult shells between 5 and 8.6 mm in length. The protoconch is smooth, consists of two globose whorls and is translucent white. After the protoconch, 5 whorls, on which two spiral cords are dominant, appear. Especially in the first whorls the shape of the whorls is spectacular as the suture is sunken very deeply

between the whorls, in a channel, and invisible to the naked eye, even under enlargement. On the third whorl, between the two spiral cords, a sculpture of fine curved axial lines appears and continues all over the shell and only disappears near the columellar area. The body whorl is gigantic, almost half of the shell length. The upper part consists of the continuation of the two major spiral cords, separated by an intricate network of thin, oblique axial lines. The lower part of the body whorl has 9 evenly spaced spiral cords. Aperture rather small, the outer lip thin and simple, siphonal canal quite broad and the sinus on top of the outer lip not very pronounced.

Inside of the aperture white. The entire shell is white, opaque, only the protoconch whorls are translucent.

Comparison and remarks: This species is close to the Atlantic *Drilliola loprestiana* (Calcare, 1841). Comparing the two: the protoconch is much more sculptured in *D. loprestiana*, and in that species, virtually all protoconch whorls are dark brown. In *D. mactanensis* sp. nov., most protoconches are cream-coloured, dark ones are exceptional and probably due to residue inside, not the colour of the shell. On top of that, the first whorls of the protoconches are smooth in *D. mactanensis* sp. nov. The spiral sculpture on the whorls is different: in *D. loprestiana*, the upper whorls bear two raised spiral bands of about the same strength. In *D. mactanensis* sp. nov., these spiral whorls are different in strength: the upper one is smaller than the lower one. The slope between the suture is big and wide in *D. mactanensis* sp. nov. and covered with a strong sculpture of small wavy axial streaks. In *D. loprestiana* the slope is much smaller and the sculpture weaker.

D. mactanensis sp. nov. lives in the same area as *D. barnsi* sp. nov.; *D. exquisita* sp. nov., *D. labradorae* sp. nov., *D. multispiralis* sp. nov. and *D. reevii* (C.B. Adams, 1850). It differs from all these species by the pure white coloration, the very large aperture compared to the shell length and the particularly broad shell. The micro-sculpture between the dominant spiral ribs is also different compared to all other species.

Etymology: This species is named after the historical Mactan Island, situated in front of Cebu City, in the central Visayan Islands, the Philippines. The large majority of the known material was found in the channel between Mactan and Olango islands.

Remarks: The type species of *Drilliola* is *Taranis emendata* Monterosato, 1872. This Atlantic species, now called *Drilliola emendata*, looks like the sister species of the *Drilliola loprestiana*, from the same waters, but the protoconch is notoriously different. It is broad and

flattened in *D. emendata*, while pointed and sculptured in *D. loprestiana*. So, apparently a great deal of variation is possible in the protoconches of the genus *Drilliola*. In our photographs, we see that the first whorls of *D. mactanensis* sp. nov. are smooth, but later whorls have an axial sculpture.

Drilliola multispiralis sp. nov.

Plate 4



Type material: Holotype: 16.4 mm. Coll. NMP, Manila. Philippines. Mactan Island. Punta Engano. Coral Point. 200 m. **Paratypes: Paratype 1:** 8.3 mm. Coll. G.T. Poppe. Philippines. Olango Island. Tingo Point. 450 m; **Paratype 2:** 11 mm. Coll. G.T. Poppe. Philippines. Olango Island. Tingo Point. 450 m; **Paratype 3:** 19.4 mm. Coll. G.T. Poppe. Philippines. Mactan Island. Coral Point. 200 m.; **Paratype 4:** 22.9 mm. Coll. MNHN, Paris. Philippines. Mactan Island. Malingin. 150 m.

Type locality: Mactan Island. Punta Engano.

Distribution and habitat: Only known from the northern side of the channel between Mactan and Olango Islands, from depths from 150 to 450 m.

Description: The holotype, an adult specimen, measures 16.4 mm in length. The protoconch consists of two very globose whorls, which are translucent, like glass. These go over in whorls dominated by two spiral cords on the five first whorls and by three spiral cords on the sixth and

seventh whorl. The area between the spiral cords is covered by tiny axial oblique ribs, going in opposite directions above and below the cords. The body whorl is particularly large, covering almost half of the shell length. One can count about 9 of the dominant spiral cords from the suture down to the siphonal canal, but they rapidly lose in strength and on the lower part of the body whorl they are faint and impossible to count. The aperture is small, about one fourth of the shell length, the sinus is deep, the siphonal canal shallow, the inside of the aperture white, there is no columellar thickening visible.

Overall colour pale cream white.

Comparison and remarks: *Drilliola multispiralis* sp. nov. lives in the waters where we also discovered *D. mactanensis* sp. nov., *D. labradorae* sp. nov., *D. exquisita* sp. nov., *D. reevii* (C. B. Adams, 1850) and *D. barnsi* sp. nov. *D. multispiralis* sp. nov. is easy to differentiate from all three other *Drilliola* by the presence of multiple spiral lines on the very big last whorl. We count 8 well-visible spiral ridges on the last whorl in the adult holotype. The last whorl is big, the aperture quite long compared to the other local species. On the second last whorl, *D. multispiralis* sp. nov. has three very well-developed spiral ridges, different in strength compared to the ones seen in the other *Drilliola* from the region.

Etymology: Named "multispiralis" after the multiple spiral ribs covering the shell.

Drilliola reevii (C.B. Adams, 1850)
Plate 4



This is a rare species in the central Philippines. Poppe (2008) figured two specimen from Aliguay Island as "*Tomopleura reevei* cf." in PMM2. Bouchet (2011) figured another identical specimen from Panglao Island in the Journal of Molluscan Studies 77(3).

The species is known to live in the central Philippines between 100 and 230 m deep, on bottoms that are a mixture of mud and gravel.

The sculpture of fine axial oblique lines and the semi-translucent material of the shell refers this species much more to *Drilliola* than to *Tomopleura*, in which there is no such axial sculpture between the spiral ribbing of the shell.

Fresh specimens of *D. reevii* are rare, we obtained only a few of these and they are easy to recognise because of the reddish brown colour line on top of the spiral ribs. When dead, this reddish brown fades into yellowish or yellowish brown and the rest of the shell also loses its discrete pinkish shine. We were at first confused by these differently coloured shells, but comparing the number of whorls, spiral ribs and the sculpture in between, we noticed they are the same species: *D. reevii*, but just faded shells. For the purpose of documentation, we also figure such a shell.

Genus: *Microdrillia* T. L. Casey, 1903

Information on the genus: At the time of writing, WoRMS lists 16 species of *Microdrillia* and states that *Microdrillia loprestiana* (Calcara, 1841) is accepted as *Drilliola loprestiana* (Calcara, 1841) and *Microdrillia pruina* (R.B. Watson, 1881) is accepted as *Retidrillia pruina* (R.B. Watson, 1881). In recent literature, the genus *Microdrillia* has indeed repeatedly been used for either *Drilliola loprestiana* and/or *Drilliola emendata* Monterosato, 1872 (See: Engl, Gomez & al., 2009; Poppe & Goto, 1991; Cossignani, di Nisio & Passamonti, 1992; Terreni, 1981; Cossignani & Ardovini, 1911; Delongueville & Scaillet, 2004; Perna, 2013).

The genus *Microdrillia* as understood today is based on the fossil type species "*Oligotoma meyeri* Cossmann, 1889" from the Eocene: Claibornian, Jackson, Mississippi. The only one figuring this type species in easy to get literature, yet with a poor quality drawing, is W. Wenz (1938). We follow this tradition. The genus is characterised by a large body whorl, and a well-developed large protoconch, the lower whorls of this protoconch usually shows axial plicae.

The following figures from recent literature are now all referred to *Drilliola*, not *Microdrillia*: *Microdrillia trina*

Mansfield, 1925, as shown by Daccarett & Bossio (2011), M. P. Williams (2006) and D. Lamy & J. P. Pointier (2017); *Microdrillia tersa* Woodring, 1928 from the Upper Miocene of Jamaica (see Wenz, 1938). The same name was used by M. A. Keen (1971) for a recent species of *Drilliola* from Panama; *Microdrillia zeuxippe* (Dall, 1919) as shown by M. A. Keen (1971); *Microdrillia difficilis* (E. A. Smith, 1879) from Japan, the syntype at the BMNH was shown by Higo, Callomon & Goto (2001), which we think is also better classified in *Drilliola*; *Microdrillia crispata* (De Cristofori & Jan, 1832) from the Pleistocene of Romagna, Italy, is also a *Drilliola*, and so is its subspecies *Microdrillia crispata vatreni* G. della Bella & C. Tabanelli, 1986; *Microdrillia speyeri* (Koch & Wiechmann, 1872), a fossil species from Mecklenburg, Sternberger, Germany, and figured by R. Janssen, 1978 is also a *Drilliola*.

Microdrillia has a number of fossil species, of which MolluscaBase lists 4 species. We can add to these: *Microdrillia bicingulata* (Sandberger, 1860) from the Lower Rhine, Moers, Rumein, Germany. This species looks very close to the recent *Microdrillia pertinax* (Hedley, 1922); *Microdrillia cossmanni* (Meyer, 1887) from Mississippi, Jackson, as shown by Powell (1966).

Judging from the photograph of *Microdrillia serratula* (Bellardi, 1877) by G. della Bella and C. Tabanelli (1966), this species should be removed from *Microdrillia*. This fossil shell may belong to a species in the family Turridae s.s.

The case of *Microdrillia niponica* (E.A. Smith, 1879) is here rectified: we erroneously used the name in the PMM books for the species here described as *Drilliola mactanensis* n. sp. The large last whorl and the sparse spiral cords indeed refer this species much more to the genus *Microdrillia* and it was treated as such in Higo, Callomon & Goto (2001).

The following *Microdrillia*, which we truly believe to belong to that genus as understood today, are figured in recent literature. This list is not exhaustive, and only what we have as figures on our fingertips.

M. circumvertens (Melvill & Standen, 1901) - Gulf of Oman

M. commentica (Hedley, 1915) - Philippines. Australia, Queensland. The holotype is shown on the website of the Australian museum.

M. fastosa Hedley, 1907 - Australia. New South Wales. After a drawing by Laseron, 1954.

M. cf. optima (Thiele, 1925) - Philippines. Panglao. A quite distinct species, probably undescribed, figured by Bouchet & al., 2011.

M. niponica (E.A. Smith, 1879) - Japan.

M. pakuarangia Powell, 1942 - New Zealand. Pakaurangi. See A.W.B. Powell (1966).

M. pertinax (Hedley, 1922) - Philippines. Documented in PMM 2 (2008). Vietnam (Thach, 2012).

M. sagamiensis (Kuroda & Oyama, 1971) - A Japanese species, the holotype was shown by Higo, Callomon & Goto (2001). Also documented by T. Kuroda & T. Habe (1971). We think that the *Microdrillia* species from Hawaii, Maui, as shown by Severns (2011) may be an undescribed subspecies of *M. sagamiensis*, with subtle differences with the Japanese shells only.

M. stephenensis Laseron, 1954 - Philippines. Australia. Figured with a drawing by Laseron, 1954, for the description. This is possibly a synonym of *M. commentica* (Hedley, 1915)

M. rhomboidalis Stahlschmidt, Poppe & Tagaro, 2018 - Philippines.



Microdrillia niponica

(E. A. SMITH, 1879)

ST : BMNH 1878.10.16.33

The syntype of the real *Microdrillia niponica* in the BMNH. A Japanese species. After Higo, Callomon & Goto (2001). Photo courtesy Y. Goto.

***Microdrillia engelsei* sp. nov.**

Plate 5

Type material: Holotype: 8.5 mm. Coll. NMP, Manila.

Philippines. Mactan Island. Punta Engano. 180-250 m.

Paratypes: Paratype 1: 8.7 mm. Coll. Guido T. Poppe.

Philippines. Mactan Island. Punta Engano. 180-250 m.



Type locality: Mactan Island. Punta Engano.

Distribution and habitat: The two known specimens both come from the Mactan channel on Punta Engano. These bottoms are either gravel or mud or a mixture of both. They come from relatively deep waters: 180 to 250 m.

Description: The size of the adult shells known is between 8.5 and 8.7 mm in length. The protoconch has four translucent whorls. The upper whorls are smooth, the third and fourth whorl are covered with strong axial folds. These protoconch whorls are followed by 4 whorls that have one very dominant and one sharp secondary spiral cord. The secondary spiral cord is just below the suture, the dominant spiral cord more to the centre of the whorls. On the penultimate whorl, below the dominant spiral cord, one can see three smaller cords. The body whorl is large, almost half of the shell length. The sub-sutural area is concave, the rest of the body whorl convex. On the subsutural area, a sculpture of tiny, oblique, raised axial lines. Below that a large number of spiral cords going down to the siphonal canal. The aperture is long and narrow with a sharp outer lip. The sinus is not very deep, the siphonal canal not very wide. There is a thin columellar callus present.

Overall coloration a warm pale brown, also inside the aperture.

Comparison and remarks: Because of the brown coloration and the slender shape, we only have to compare this species with the slightly similar, but when observing the details, very different *Microdrillia pertinax* (Hedley, 1922). *M. engelsei* sp. nov. is about twice as big as well-sized *M. pertinax*. The spire is much slenderer and straight in shape, while broad and slightly more convex in *M. pertinax*. *M. pertinax* can readily be distinguished by the broad spiral ribs covering the entire shell, also the last whorl. This in contrast with *M. engelsei* sp. nov., which has only one spiral rib in the centre of the upper whorls, but not on the body whorl. The body whorls are covered with fine spiral striae not seen in *M. pertinax*. The aperture is also bigger and slenderer in *M. engelsei* sp. nov. than in *M. pertinax*.

Etymology: The name honours the late Mattijs H. M. Engelse, from Meliskerke-Biggekerke, the Netherlands. For several decades "Thijs" kept a big warehouse, mainly selling seashells but also other sea life and souvenirs to passing tourists in Zeeland, a beautiful area in the south of the Netherlands. In the 1970s and 1980s he regularly imported big quantities of shells from the Philippines, but also had a good selection "for collectors". Thijs always welcomed the first author in his young years, for exchanging in a time he could not afford the more expensive items. It is with much pleasure and the best memories we name this beautiful species after "Thijs" Engelse as he was known in the Dutch and Belgian malacological circles.

Remarks: At first we had our doubts as to the assignment of this species to *Microdrillia*, but the protoconch, the first whorls and the large body whorl convinced us that this is the right place for this beautiful Borsonid.

Microdrillia papavasili sp. nov.

Plate 5

Type material: Holotype: 4.4 mm. Coll. NMP, Manila. Philippines. Mactan Island. Punta Engano. Malingin. 60-80 m. **Paratypes: Paratype 1:** 5 mm. Coll. MNHN, Paris. Philippines. Mactan Island. Punta Engano. Malingin. 150 m; **Paratype 2:** 5.4 mm. Coll. KBIN, Brussels. Philippines. Mactan Island. Hadsan. 150 m; **Paratypes 3-7:** Coll. G. T. Poppe; **Paratype 8:** coll. Kyriakos Papavasileiou, Thessaloniki, Greece; **Paratypes 9-18:** Conchology, Inc.

Type locality: Mactan Island. Punta Engano.



Comparison and remarks: *Microdrillia commentica* (Hedley, 1915) has about the same shape as the new species, but the last whorl is entirely covered with raised horizontal spiral ridges. The size is slightly bigger and on the upper whorls, each whorl has a big, raised rib with a smaller one below. The smaller rib is absent in *M. papavasili* sp. nov.

Microdrillia rhomboidales (P. Stahlschmidt, G.T. Poppe & S.P. Tagaro, 2018) has a much broader rib and is considerably larger.

Etymology: The species honours Kyriakos Papavasileiou from Thessalonika, Greece. Kyriakos has intensively collaborated with Conchology, Inc. for many years and through his conchological endeavours a large quantity of excellent material has reached the wide public. Therefore, we dedicate this beautiful and delicate species to him.

Distribution and habitat: All material known comes from the channel between Mactan and Olango Islands, except for two pieces that were dredged between Lipata and Basul Island. The bottoms in the Mactan channel are either gravel or mud or a mixture of both. The lightness of the shells suggests that *M. papavasili* sp. nov. is a mud dweller. All material comes from between 60 and 250 m deep, with many taken between 120 and 180 metres. However, we were told the two Surigao shells were found between 30 and 60 m.

Description: The size of the adult shells is between 4.3 and 6.6 mm in length. The protoconch is gigantic: it consists of 3¹/₂ smooth translucent whorls, followed by 2 whorls covered with straight axial ribs. All these protoconch whorls are brown in colour. The next whorls, including the big body whorl, are only 3¹/₂ whorls in total. They are white in colour. The sculpture consists of two strong spiral ribs, one on top of each whorl, and then with an oblique slope going to the second spiral rib. There is no minor sculpture to be seen. The body whorl is big, about half of the shell length. When seen from the ventral side, one can see a ridge below the upper spiral rib on top of the body whorl. As one goes down to the siphonal canal, this is followed by a flat area, after which a number of spiral ridges - or incisions (?) - are seen. They become numerous near the siphonal canal and all end on the columellar side in a small fasciole. The aperture is large, the siphonal canal wide, the outer lip sharp.

The overall colour of the shell is white, apart from the brown protoconch whorls and a brown pattern covering the upper spiral rib on the body whorl, all around.

Microdrillia peculiaris sp. nov.

Plate 5



Type material: Holotype: 7 mm. Coll. NMP, Manila. Philippines. Cebu. Liloan. 180-250 m.

Type locality: Cebu. Liloan.

Distribution and habitat: Only known from the type locality. The type of bottom it was collected on is unknown.

Description: The holotype is the only specimen known at present, and it measures 7 mm in length. The upper protoconch whorls are broken off, we suspect two whorls are missing, and a small piece of the last broken whorl remains. This is followed by three big and broad protoconch whorls with a strong sculpture of curved axial waves - ribs all over; much as seen in the other members of the genus, but here even more developed. This is followed by three more whorls before the body whorl starts. The suture between these whorls is almost invisible, even under magnification. The first two whorls consist of 2 big spiral ribs. Between the upper two spiral ribs there is a sculpture a fine, curved axial ribs. On the third whorl, we see that this sculpture between the two upper ribs continues, but below that, 3 more smaller spiral ribs appear. We then arrive at the body whorl where we see the same sculpture as on the penultimate whorl, but below the two big spiral ribs with the axial sculpture in between, we see up to 12 minor spiral ribs, arriving on the tip of the siphonal canal. The mouth is badly damaged, but is relatively small.

The entire shell is white.

Comparison and remarks: This species is close to *Microdrillia pertinax* (Hedley, 1922), but it is almost double the size of a well-sized *M. pertinax*. It shares the colouration with *M. pertinax*, which is occasionally also white in *M. pertinax*, and the elongate slender shape with the very big protoconch. In the holotype of *M. peculiaris* sp. nov., the upper tip of the gigantic protoconch is broken off, but the last 3 whorls of that protoconch are still present and allow us the generic assignment. Both species differ tremendously in the sculpture of the whorls: *M. peculiaris* sp. nov. has whorls covered with 3 regular, raised, small ribs. One rib below the suture, one in the centre and a third very weak one above the next suture. *M. pertinax* also has whorls covered with three ribs, but they are big and rounded, the central one is gigantic and that rib dominates the sculpture of the shell. The body whorl of *M. pertinax* is covered with big ribs; they are hardly visible on the white shell of *M. peculiaris* sp. nov. We refer to the plates to see these differences confirmed in a visual way.

Etymology: "Peculiar" means "different from the normal or the expected; something strange", whence the name *M. peculiaris* sp. nov. As this single known specimens stands out from all other known *Microdrillia* by the cigar-shape and strongly built shell with a different sculpture.

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Plate 1

Bathytoma klinkeni n. sp.

1. Holotype. 75.9 mm. Taiwan. Offshore. 300-400 m. Coll. MNHN, Paris.
2. Paratype 1. 80 mm. Taiwan. Offshore. 300-400 m. Coll. G.T. Poppe.
3. Paratype 3. 76.3 mm. Taiwan. Offshore. 300-400 m. Coll. G.T. Poppe.
4. Paratype 2. 73.5 mm. Taiwan. Offshore. 300-400 m. Coll. G.T. Poppe.



Plate 2

Drilliola barnsi n. sp.

1. Holotype, 7.8 mm. Philippines. Mactan Island. Punta Engaño. 150-250 m. Coll. NMP, Manila.
2. Paratype 1, 8.3 mm. Philippines. Mactan Island. Punta Engaño. 150-250 m. Coll. MNHN, Paris.
3. Paratype 3, 13.6 mm. Philippines. Mactan Island. Coral Point. 100-250 m. Coll. G.T. Poppe.

Drilliola exquisita n. sp.

4. Holotype, 15 mm. Philippines. Mactan Island. Maribago. 80-120 m. Coll. NMP, Manila.
5. Paratype 1, 12.7 mm. Philippines. Mactan Island. Malingin. 100 m. Coll. MNHN, Paris.
6. Paratype 2, 15 mm. Philippines. Mactan Island. 100-150 m. Coll. G.T. Poppe.



Plate 3

Drilliola labradorae n. sp.

1. Holotype. 8.6 mm. Philippines. Cebu. Liloan. 80-150 m. Coll. NMP, Manila.
2. Paratype 2. 9.8 mm. Philippines. Cebu Liloan. 80-150 m. Coll. MNHN, Paris.
3. Paratype 12. 11.5 mm. Philippines. Mactan Island. 100 m. Coll. G.T. Poppe.

Drilliola mactanensis n. sp.

4. Holotype. 7.6 mm. Philippines. Mactan Island. Coral Point. 240 m. Coll. NMP, Manila.
5. Paratype 2. 6.4 mm. Philippines. Mactan Island. Punta Engaño. 180-230 m. Coll. MNHN, Paris.
6. Paratype 40. 8 mm. Philippines. Mactan Island. Malingin. 180-250 m. Coll. G.T. Poppe.



Plate 4

Drilliola multispiralis n. sp.

1. Holotype. 16.4 mm. Philippines. Mactan Island. Coral Point. 200 m. Coll. NMP, Manila.
2. Paratype 4. 22.9 mm. Philippines. Mactan Island. Malingin. 150 m. Coll. MNHN, Paris.
3. Paratype 3. 19.4 mm. Philippines. Mactan Island. Coral Point. 200 m. Coll. G.T. Poppe.

Drilliola reevii (C. B. Adams, 1850)

4. 16.4 mm. Philippines. Mactan Island. Malingin. 180 m. Coll. G.T. Poppe.
5. 12.8 mm. Philippines. Olango Island. 150-200 m. Coll. G.T. Poppe.

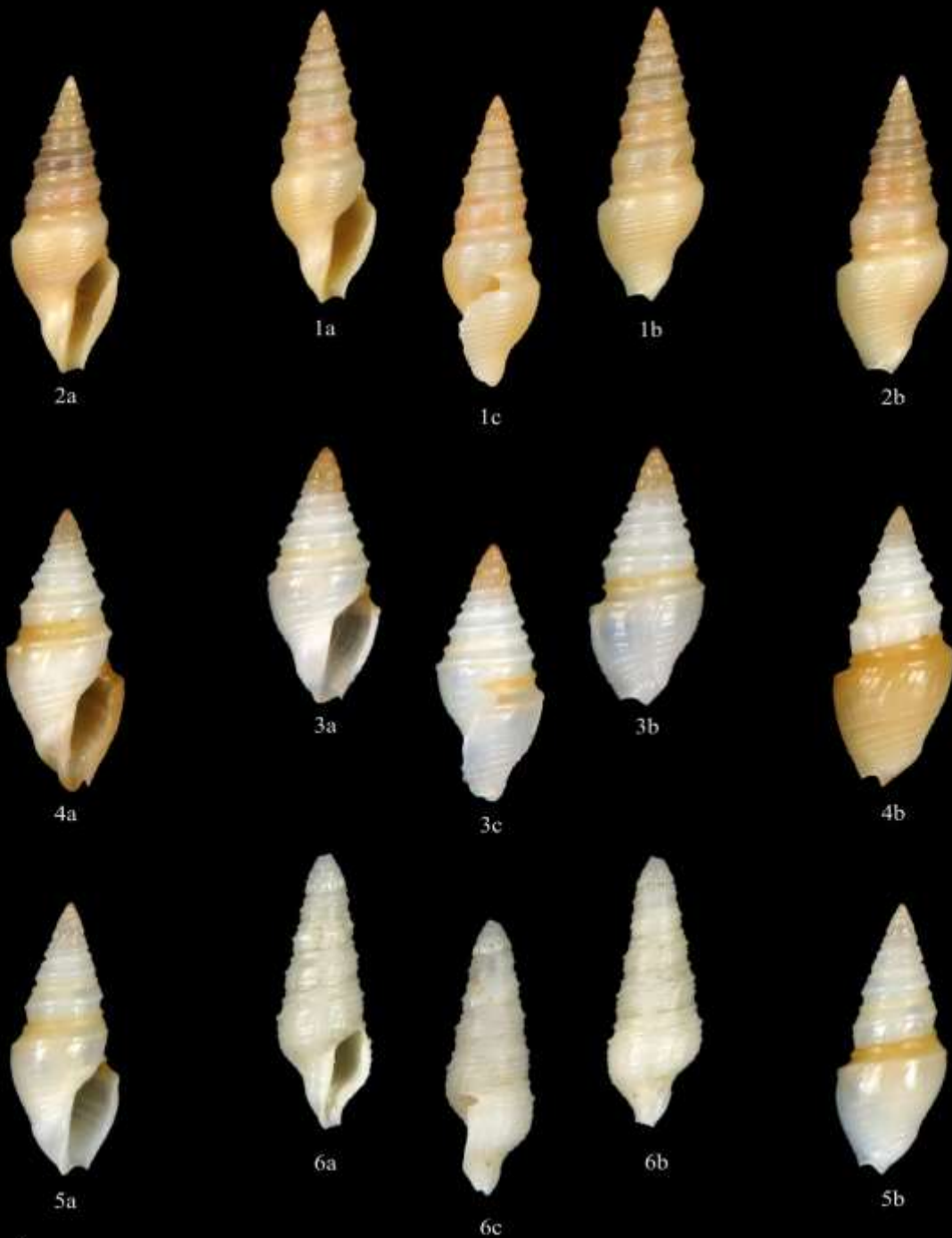


Plate 5

Microdrillia engelsei n. sp.

1. Holotype. 8.5 mm. Philippines. Mactan Island. Punta Engaño. 180-250 m. Coll. NMP, Manila.
2. Paratype 1. 8.7 mm. Philippines. Mactan Island. Punta Engaño. 180-250 m. Coll. G.T. Poppe.

Microdrillia papavasili n. sp.

3. Holotype. 4.6 mm. Philippines. Mactan Island. Malingin. 60-80 m. Coll. NMP, Manila.
4. Paratype 3. 6.5 mm. Philippines. Mactan Island. Punta Engaño. Malingin. 100 m. Coll. G.T. Poppe.
5. Paratype 7. 5.5 mm. Philippines. Mactan Island. Punta Engaño. 180-230 m. Coll. G.T. Poppe.

Microdrillia peculiaris n. sp.

6. Holotype. 7 mm. Philippines. Cebu. Liloan. 180-250 m. Coll. NMP, Manila.



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30th International Shell Show Antwerp

Na bijna twee jaar zonder enige Europese schelpenbeurs was het op 4 en 5 september eindelijk nog eens zover: onze eigen vereniging zette ondanks alle organisatorische moeilijkheden en onzekerheden door en verwelkomde jullie op de 30^e beurs, die ook dit keer doorging in sporthal Kattenbroek te Edegem. Dat een aantal standhouders het omwille van reisbeperkingen er niet was, hoeft geen betoog: daar was iedereen zich op voorhand van bewust, maar we focusten met z'n allen -zowel organisatie, helpende handen, standhouders én bezoekers- op het positieve: het samenzijn met andere verzamelaars om over onze mooie hobby te spreken, inzichten of materiaal uit te wisselen en op jacht te gaan naar die soorten of mooie exemplaren die onze collectie kunnen verrijken op de rijkgepulde tafels. Hierbij enkele impressies van een fijne, erg gesmaakte beurs.



Beide competities rond Shell of the Show kenden een wel heel aparte ontkenning: publiekssjury en internationale jury beloonden immers dezelfde schelpen in dezelfde volgorde. De jongste winnaars ooit konden hun fierheid moeilijk onder stoelen of banken steken...



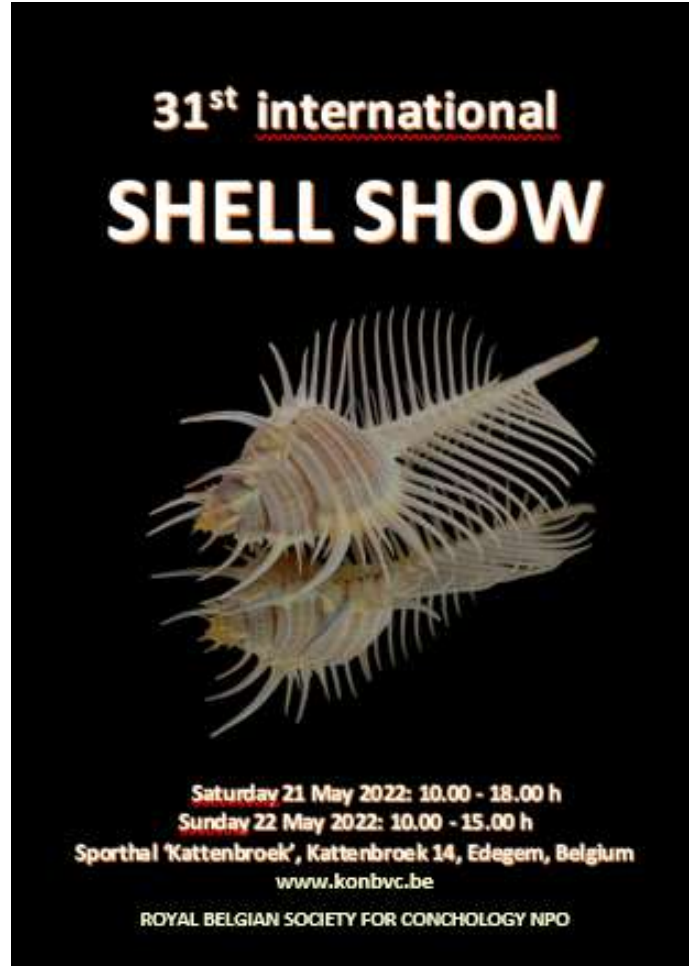
Alle winnaars op een rijtje:

eerste rij: Carsten & Lucas Monsecour (1^e prijs met een scalariforme *Tibia curta* – zie achterkaft);
tweede rij: Dirk Deboe (3^e prijs met *Tudicula zanzibarica*),
Ronald Bienfét (2^e prijs met een 'freak' *Lobatus goliath*) en
Peter Ackermans (winnend ontwerp affiche 2021)

Op zondag werd de 60^{ste} verjaardag van onze vereniging, samen met de mijlpaal van de 30^e beurs ook op traditioneel Vlaamse wijze gevierd met gebak geïnspireerd op de affiche en sierlijk afgewerkt met voor onze passie gepast artisanaal suikergoed. Dit alles op zaterdag vervaardigd door één van onze nieuwste leden.



We zien jullie uiteraard graag terug op de 31^e editie, die zal doorgaan op 20 en 21 mei 2022! De affiche voor deze nieuwe editie werd democratisch gekozen uit 6 verschillende inzendingen van onze leden. De strijd was spannend, maar uiteindelijk kreeg deze kunstzinnige foto van een *Murex pecten* op een spiegel, een foto van Gilbert Verbinnen, het meeste stemmen achter zich.



Meer foto's van deze beurs kan u vinden op onze facebookpagina (Kon. BVC) of op de inlogzone van de website.

Met dank aan Albert Van den Bruele, Freddy van Nieulanden en Chris Vos voor de foto's.

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Tibia curta (Sowerby, 1842) – scalariform specimen
Cuddalore, India.
Shell of the Show 2021 - Coll. C. & L. Monsecour
Photo: G. Verriest